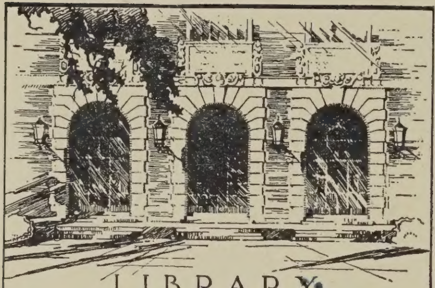

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The Paper Maker

Number One ♡ 1946

PUBLISHED FEBRUARY, 1946
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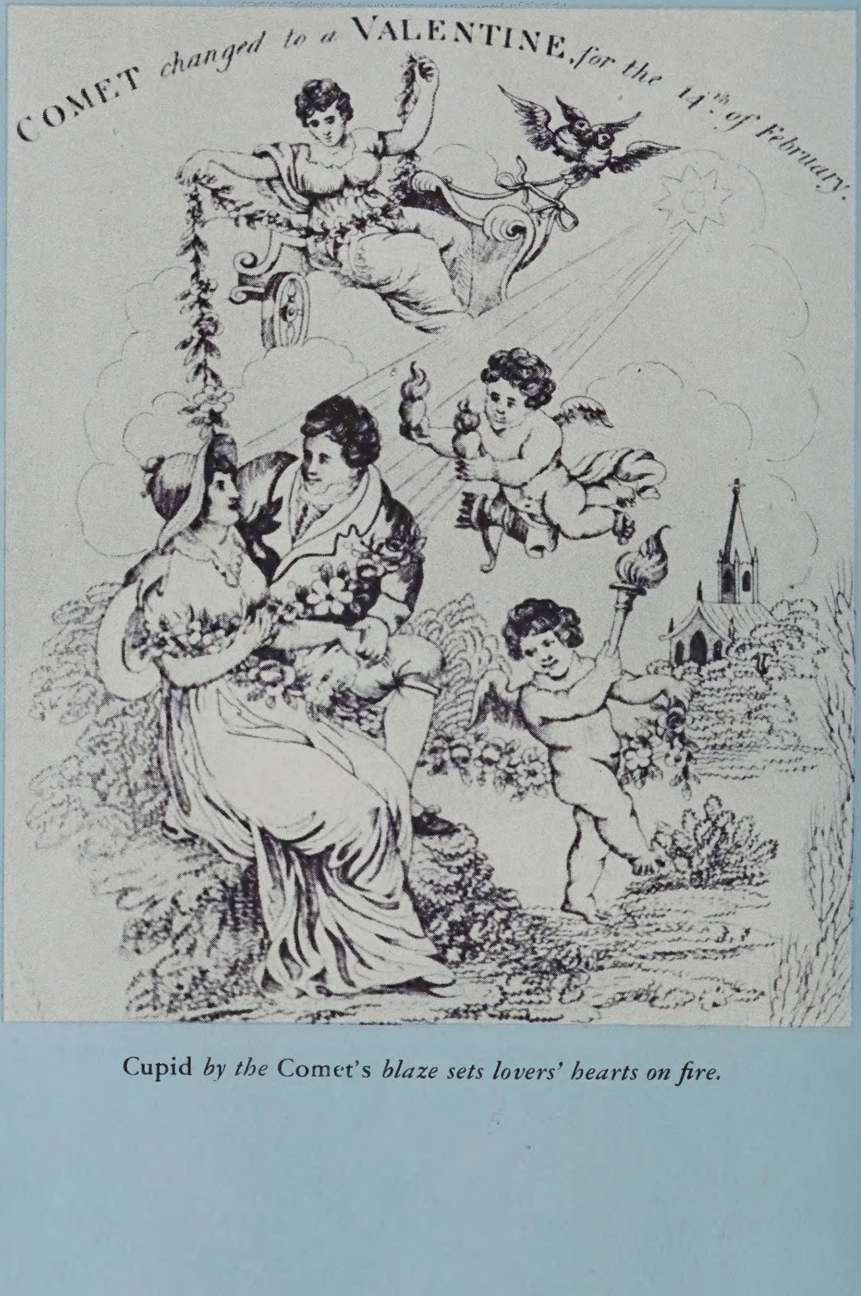
COMET changed to a VALENTINE, for the 14th of February.

Cupid *by the* Comet's *blaze sets lovers' hearts on fire.*

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The Origin of VALENTINES

by WILLIAM BOND WHEELWRIGHT

SAINT VALENTINE'S connection with "valentines" is strictly coincidental. According to John Brand's *Popular Antiquities*[1], this Saint "was a man of singular chastity of life. I have searched the legends of St. Valntine but think there is no occurrence in his life hat could have given rise to this ceremony."

Originally the things we call "valentines" had nything but a chaste significance. Butler, in his *ives of the Saints*, says that the custom "origiated with the Romans, and that on the Feast of ebruata Juno, boys drew the names of girls in rder to be able to divine who should be their istress, and that this pagan usage giving offense the Christian priesthood, the names of saints ere substituted on the slips of paper for those f sweethearts." Apparently the Romans of old ad their teen-age problems in the days of mperor Claudius, in whose reign Saint Valenne was beheaded!

Other writers and authorities recognize in the Valentine anniversary, traces of the Roman and Italian celebration known as the "Tupercolia." At this ceremony, which centered around the idea of fruitfulness, the priests after sacrificing animals, cut leather thongs from the sinews, which were called "februa." As the priests passed through the streets, the women crowded around them so as to be struck by the thongs in the belief that fecundity would thereby be promoted.

Apparently the name of our second month is derived from the "februa." The Feast of "februata" occurring on the 13th of this month coincided with the festival of the chaste Saint Valentine, and when the reformation of the *Feast of Februata Juno* occurred the pagan nomenclature was given up and the day christened "St. Valentine's."

Another suggestion regarding the origin of the festival is that the day celebrated opens the season when birds choose their mates. This might well be in the climate of Italy, and there is a definite plausibility in this idea. According to Bourne, the

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[1] ohn Brand's "Popular Antiquities," edited by W. C. Hazlett, London, 1905.

ceremony of St. Valentine's "is never omitted among the vulgar to draw lots which they term valentines, on the eve before Valentine's Day. The names of a select number of one sex are, by an equal number of the other, put into some vessel; and after that everyone draws a name, which for the present is called their valentine, and is looked on as a good omen of their being man and wife afterward."

In our researches we found no trace of the transition from the observances described to those we recall in our own youth. Before the manufacture of "greeting cards" had become the flourishing industry of today, it was common for youths and maidens to make their own valentines. At the stores one could buy decorative gummed devices such as hearts and turtle doves with which to ornament the homemade cards. Then there were those fascinating decalcomania supplied in variegated designs, which after careful wetting could be transferred to the valentine in process of making.

On these decorated cards the sentiments, usually in verse, were written. Their trend was tenderly romantic as a rule. Of course, those with money to spare could purchase all sorts of valentines ready-made. Some were elaborately contrived with borders of lace paper surrounding some sentimental design, below which was printed some mushy verse. But there were also the most atrocious "comic" valentines, printed in garish colors, embellished with outrageous cartoons and verses anything but complimentary. Saint Valentine's Day had become the occasion either to compliment or insult the object of one's affection or the victims of one's pet peeve!

This dual use of the occasion goes back at least a century, but the records are scanty. There is but one collection of Valentine verse in the largest university library in the world—Widener Memorial Library of Harvard. An examination of this thin booklet indicates that it was printed on a hand press, on machine-made paper of an early date, but there is no date given on the title page of *Liber Amoris*, or the *Book of Love*, a choice original collection of sentimental and comic valentines, published in London by A. Park.

A few quotations will indicate that there is little to choose between the more ancient and more recent valentine literature.

To A Soldier

Wounded sore with love's own scars
I hail thee gallant son of Mars,
Proudly would my fond heart yield.
And follow to the camp or field
And all the wounds that love can make
I will suffer for thy sake,
Even yielding, even free
Pledged in love and constancy.

Apparently war has always had about the same emotional effect upon the fair sex.

We find another title, "Shipman's 'Carolina,' 1757," which supplies some further information concerning the traditional celebration of Valentine's Day.

This month bright Phoebus enters Pisces
The maids will have good store of kisses
For always when the fun comes there
Valentine's Day is drawing near.
And both the men and maids incline
To chuse them each a valentine
And if a man gets one he loves
He gives her first a pair of gloves
And, by the way, remember this
To seal the favor with a kiss.

This kiss begets more love, and then
That love begets a kiss again,
Until this trade the man doth catch
And then he doth propose the match.
The woman's willing, tho' she's shy,
She gives the man this soft reply,
"I'll not resolve one thing or other
Until I first consult my mother.
When she says so, 'tis half a grant
And may be taken as consent."

These two poems are typical of the "sentimental" collection. The comics deal largely with en of various trades, particularly related to the raphic arts. In their lines one soon recognizes uns upon technical terms of the various craftsen. This form of gag is well exemplified in the erse "To a Letterpress Printer."

No, no, my dirty devil no,
Avaunt my sight and quickly go;
For I can tell you this, no less
I'm not inclined to go to press.
You'll ne'er get registered you brute
And neither will your "blanket" suit
You'll never taste love's wedded sweets
Nor will you be done up in sheets.
Not till the devil claims you his own
TOKEN'D and nicely *wetted down*
For well we know with such a fool
The devil has *registered* his PULL.

Then there is the verse "To a opper-plate Printer." Four lines vill suffice to reflect its trend:

Now are you not a pretty dear
A suck mug lad—for gin and beer,
For pleasant looks all sore at loss
And every day upon the cross.

While the papermaker seems to ave been overlooked in this collecion of valentines, there is a verse or "The Paper Stainer." We take t that this craft was that of coloring r coating paper by hand. The reader nay judge from the following lines:

To A Paper Stainer

Now man of the slush-tub, d'ye think I could wed
Or take such a daub-spotted monster to bed,
Such a thing as you are—that humanity calls
To hang you at once, pasted on to the walls.
Great stainer of paper, I'd have you beware
Of Cupid's own slush-tub I pray have a care,
For his DOLLY will smash all your vows to the wind
And leave but a sorry impression behind.
Your pattern is rascally bad, as we know
And old nick will fast follow, wherever you go.

Whatever we may think of this way to celebrate the advent of spring when "Young men's fancy turns to thoughts of love," it at least is a means of bringing more grist to the mills of the paper industry. So we should count among our patron saints the good St. Valentine.

"If constancy can warm you into love
You'll find me faithful as the Turtle Dove.
A zealous friend, companion, kind and true,
Whose only care will be to pleasure you.
My [illegible] hope is that you may incline
To make me happy and your Valentine.

WHEN THE U. S. WOOD PULP INDUSTRY WAS YOUNG

Random News Selections from the Trade Press of the Time

by

HARRY E. WESTON

Case Brothers, of South Manchester, Conn., are erecting a chemical wood-pulp mill whose daily product—three tons—will all be required for use in the six paper mills owned by the company. A supply of pure spring water will come to the new mill through nearly half a mile of eight-nch cast-iron pipe. *The Paper World*, *1*, No. 8:34 (August, 1880).

A mill for the manufacture of spruce pulp has been erected by G. H. P. Gould at Lyons Falls, New York. The mill will be run by the Taylor & Outterson process, and be able to produce two tons of dry pulp daily. *The Paper World*, *1*, No. 2:26 (February, 1881).

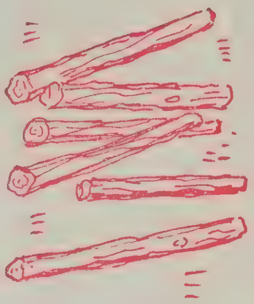
Until recent years only a few varieties of wood were used in making wood-pulp. The poplar was early liked for this purpose on account of its clear white fibre and the ease with which it could be converted into pulp. Spruce has been considerably used of late, and hemlock makes a good quality of pulp. A large number of factories have been established for the making of wood pulp alone, and there are good reasons why its manufacture should be often carried on separate from the other processes of papermaking. Less capital is needed for making pulp only. The cost of a modern wood-pulp mill, with a capacity of five tons a day, is about $30,000, while a paper mill of the same capacity would cost not less than $100,000. Moreover, since pulp, as a commercial commodity, is easily transported, pulp-making, unlike the papermaking process, which can often best be carried on in or near some city, can be advantageously conducted in an out-of-the-way place where abundance of timber is at hand, and where water-power, the cheapest of motive powers, and often found in connection with the clear, pure water necessary for pulp-making, is abundant . . . *The Paper World*, *3*, No. 3:8 (September, 1881).

"TALL OAKS FROM LITTLE ACORNS GROW."
—*David Everett.*

The Victoria Paper Mills Company, Fulton, New York, started its new pulp mill on June 20 [1882]. The main building is of brick, 40 by 46 feet, with iron roof. The mill contains two Voelter wood-grinding machines and one 48-inch wet machine. These are driven by a 66-inch Leffel "Special" turbine wheel, giving 250 horsepower. The power is communicated to the machinery by a 5-inch steel shaft, 36 feet long, running in bronze boxes. The mill has a capacity of 3,600 pounds of dry pulp every twenty-four hours. Part of the product will be used by the Victoria mills, and the remainder by F. G. Weeks in his mills at Skaneatales. *The Paper World*, *5*, No. 2:28 (August, 1882).

The Penobscot Chemical Fibre Company is rapidly completing one of the largest pulp mills in the country, at Great

Works, Maine, which, when in operation, will turn out twenty tons of pulp per day. There are four mill buildings all two stories high and connected with each other. They will contain 5 digesters, 24 mixer tanks, 8 washing engines, 3 blocks of reclaiming furnaces, 2 chippers, and an 84-inch machine with 21 dryers; 350-horsepower will be furnished by 4 turbine wheels, fed by 2 iron penstocks, 9 feet in diameter, connecting with a canal 22 feet wide and 14 feet deep, which has been dug for about one-fourth of a mile, that the water may be delivered as required. It will cost about $320,000 when complete. *The Paper World* 6, No. 4:26 (April, 1883).



The Pioneer Pulp Company at Alta, California, has just been completed and put into operation, and is producing ten tons per day. Several carloads have been shipped to the paper mills at Stockton. This is the first wood pulp mill on the Pacific coast. *The Paper World*, *6*, No. 5:29 (May, 1883).

The Chemical Fiber Manufacturers' Association held their second annual meeting at the Grand Union Hotel, Saratoga, July 30, 1884, the representation being as follows: The American Wood Paper Co. by E. Embree, Connecticut River Pulp Co. by Moses Newton, Russell Paper Co. by G. W. Russell, Somerset Fiber Co. by C. D. Brown, Hudson River Water Power and Paper Co. by H. J. Medbery, and the Chemical Pulp Co. by C. C. Clark.

After a full discussion of the situation, an agreement was concluded by which each mill is to be shut down one week in August and one week in September, thus reducing the product about two thousand tons. *The Paper World*, *9*, No. 2:21 (August, 1884).

The beginning of the new year saw the new pulp mill of the Falls Manufacturing Co., at Oconto Falls, Wisconsin, in full operation. *The Paper World*, *10*, No. 2:18 (February, 1885).

The leading papermakers of the Fox River Valley, Wis., after having carefully examined all other processes for the manufacture of sulphite, patented lately in this country and Europe, have concluded to adopt the Mitscherlich process, used largely in Europe. This process seems to give the best results in regard to fibre and also in regar to cheapness of production and plants. A syndicate consisting of T. A. Kimberly, C. B. Clark T. C. Shattuck, H. Babcock, of the Kimberly Clark Mills, at Neenah and Appleton, the Atla Paper Company, of Appleton, A. W. Patton, Ton Patton and John McNaughton, of th Winnebago Paper Mills at Neenah, an the A. W. Patton Mill, Appleton, J. B Davis, W. L. Davis, D. R. Davis, of th Winnebago Paper Mills, and Oscar Thil many, of the American Pulp Company Kaukauna, have purchased the paten rights for their territory for the manufacturing of sulphite after the Mitscherlich process and will erect large work under the supervision of an engineer, t be sent here by Mitscherlich from Europe Appleton Post through *The Paper World*, *11*, No 6:23 (December, 1885).

Two years ago several leading paper manufacturers, dealers, and capitalists, principally i New England, foresaw the possibilities of sulphit fiber in the United States and formed a syndicat [American Sulphite Pulp Company] to introduc its manufacture here. Various members of th syndicate went to Europe and have repeatedl gone there in the meantime, to examine the different processes and negotiate for the control o the United States and Canada in the use of th patents. They at last pitched upon the Ritter Kellner and the Partington processes and bough the exclusive use of the patents for this countr and Canada. These patents cover the digester, th process of producing the by-sulphite of lime an all features of the system. *The Paper World*, *13* No. 2:2 (August, 1886).

The chemical fibre mills of the country ar 25, owned by 24 companies, and making 255 ton of soda fibre and a few tons of sulphite. Main heads the list with seven mills; Philadelphia ha five, New York four, New Hampshire and Michigan two each, and Delaware, Massachusetts, an Wisconsin each one. [Apparent discrepancy o two mills.]

Sulphite is beginning to be made, there being mill at Monico, Wis., and one at Alpena, Mich. the latter making 12 tons a day. There is also new sulphite mill at Appleton. All these use th Mitscherlich process. The Ekman process has bee in use in Providence, R. I., by the Richmon aper Company, recently failed. *The Paper World*, , No. 4:17 (October, 1887).

The Dexter Sulphite Pulp and Paper Co. of exter, N. Y., with C. E. Campbell for president; . T. Birmingham, secretary and treasurer; J. A. atman, vice president and general manager, and 00,000 capital, has commenced the erection of twenty-ton plant, under license from the ternational Sulphite Fiber Paper Co. of Detroit. *he Paper World*, *15*, No. 5:22 (November, 1887).

The Bremaker-Moore Paper Company at uisville, Ky., now have four of the Bremaker pat t sulphite boilers in successful operation. This com ny has a female chemist, who is an expert in her ofession, and gives entire satisfaction in her work. *he Paper World*, *17*, No. 2: 14 (August, 1888).

It is estimated that over 40 wood-pulp mills ve been built during the last year in the United ates. In the West it is quite the fashion to change w-mills into pulp-mills. *The Paper World*, *18*, o. 1:19 (January, 1889).

Oscar Thilmany, who bought out the Ameri n Pulp Company of Kaukauna, and is to erect conjunction with it a paper mill, has ordered om the Beloit Iron Works an 82-inch Four inier. The firm has been reorganized under the me of the Thilmany Paper and Pulp Company. *he Paper World*, *18*, No. 3:12 (March, 1889).

The Wisconsin Sulphite Company's mill at onico was burned February 8 [1889], together ith the machine shops and other buildings. The tal loss is estimated at $120,000. It was the ly mill of the kind in the state and had capacity of 10 tons a day, employing 0 hands. *The Paper World*, *18*, No. 16 (March, 1889).

The price of spruce timber for lp has declined at Carthage (New ork) within a year from $12.50 to $9.75 r 1,000 feet. *The Paper World*, *18*, o. 4:13 (April, 1889).

The International Sulphite Fiber and Paper ompany has settled with W. Thilmany in a anner satisfactory to both parties. Mr. Thil any acquires the exclusive right to the patent manufacture sulphite fiber under the Mitscherlich process, in a mill of twenty tons daily capacity, for the entire Fox River Valley in the State of Wisconsin. He will commence operations at once, with a paid-up capital of $300,000, in which some of the members of the International Fiber and Paper Company, as well as Detroit capitalists will be largely interested. *The Paper World*, *18*, No. 5:14 (May, 1889).

The Willamette Pulp and Paper Company have begun work on a new mill at Oregon City, W. T., for making sulphite pulp. It will cost $100,000. *The Paper World*, *18*, No. 6:17 (June, 1889).

Waldemar Thilmany of Appleton, Wis., is reported to have sold to an Eastern syndicate represented by Don M. Dickinson of Detroit, Mich., and H. T. Thurber the franchise for a Mitscherlich sulphite fibre plant in the Fox River Valley, of 20 tons capacity. The price stated is $90,000, and the syndicate will, it is said, spend $250,000 on the plant. *The Paper World*, *19*, No. 4:14 (October, 1889).

It is announced that a new pulp and paper mill will be built this fall at the lumber mills at Mt. Tom [Massachusetts], by the American Sulphite Pulp Company, controlled by the Russells of Lawrence . . . It is reported that the pulp will be made by a new variation of the sulphite process. The product will be about seven tons a day. *The Paper World*, *19*, No. 5:14 (November, 1889).

At Kimberly, the sulphite department is completed and the first sulphite pulp was made February 17 [1890]. *The Paper World*, *20*, No. 3:13 (March, 1890).

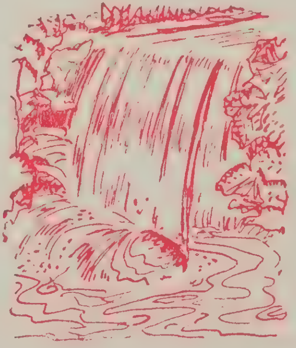
J. L. Coker, J. L. Coker, Jr., and C. J. Woodworth have been incorporated as the Carolina Fibre Company, at Hartsville, S. C. to manufacture wood fibre, chemical and mechanical wood-pulp, paper stock and paper. The capital stock is $70,000. *The Paper World*, *20*, 3:18 (March, 1890).

The largest cable conveyor in the world is said to be in operation at the Detroit sulphite fibre works on Rouge river. It conveys pulp wood from the river to the works, and is 1,850 feet in length and 25 feet high. At a recent test, it conveyed at one time 83 pieces of logs four feet in length, equivalent to a single log of 332 feet. *The Paper World*, *21*, 1:20 (July, 1890).

Four million pounds—2,000 tons—of wood pulp per day! That is about the measure of the production at the present time in the United States, if we may credit the carefully prepared figures of the chief of the forestry division of the national Department of Agriculture . . .

Of this inconceivable amount, about two-thirds is still of the variety known as mechanical ground pulp, while the remainder is about equally divided between the two branches of the chemical family—soda fiber and chemical fiber. . . . The report . . . shows the relative number and capacity of the mills in the various lines of manufacture, as follows: Mechanical, 183 mills, with a daily production of 2,649,150 pounds, or an average of nearly seven and one-fourth tons per mill; soda fiber, twenty-three mills, production 687,000 pounds, or almost fifteen tons each; sulphite fiber, twenty-nine mills, 545,000 pounds, or an average of a little more than nine and one-fourth tons; while two mills—one each in Massachusetts and New York—produced both mechanical and chemical fiber; the former 40,000 pounds daily, the latter 6,500. The total number of mills was, therefore, 237, with an average daily production of about eight and one-fourth tons each. *The Paper World*, 23, No. 3:7 (September, 1891).

The Racquette River Paper Company has been organized at Potsdam [New York] for the manufacture of sulphite fibre, wood pulp and paper. The officers of the company are: George W. Sisson, president; F. F. Flint, secretary and treasurer; and J. A. Outterson, manager. The company will utilize an excellent water power in the vicinity formerly owned by Mr. Outterson and will erect suitable buildings for the manufacture of five tons of sulphite fibre, five tons of ground wood daily, and will have a ten-ton paper mill in connection therewith. The paper and wood pulp mills will be built first and the sulphite fibre mill at a subsequent date. *The Paper World*, 24, No. 2:19 (February, 1892).



The Richmond paper mills plant at East Providence, R. I., which cost a million and a half in buildings, equipment, and experiment was recently sold at public auction to Charles Fletcher of Boston for $42,000. Mr. Fletcher immediately resold to the American Electrical works of Providence, by whom the plant will be used in their business of the manufacture of insulated electric wire. *The Paper World*, *26*, No. 2:15 (February, 1893).

The Willamette Pulp and Paper Company at Oregon City [Oregon] have had their sulphite plant shut down for some weeks while the lead-lined bronze digesters have been removed and replaced by those of steel, lined with lead and faced with cement. *The Paper World*, *26*, No. 3:34 (March, 1893).

The new pulp and paper mills of the John Edwards Manufacturing Company of Port Edwards, Wisconsin, were started up on February 1. *The Paper Mill and Wood Pulp News*, *20*, No. 52:10 (December 30, 1897).

The J. & J. Rogers Company of Ausable Forks, N. Y., has about 90,000 acres of spruce within a radius of 20 miles of its mill. Its mill is situated on the west branch of the Ausable River. The two branches unite at the Forks, a mile and a half below the sulphite plant. The transportation of the spruce wood averages about six cents per cord. *The Paper Mill and Wood Pulp News*, *21*, No. 2:29 (January 13, 1898).

Ground was broken on June 25; [1898] for the new paper and pulp mills of Ernst R. Behrend & Co. at Erie, Pa. It is expected that all the buildings will be roofed over by December 1 They will all be of brick and two stories high. *The Paper Mill and Wood Pulp News*, *21*, No. 27:20 (July 7, 1898)

The new paper mills of Ernst R Behrend & Co. at Erie, Pa. are on a bluff 60 feet above Lake Erie. All the machinery for these mills will be built by the Pusey and Jones Company of Wilmington, Del. There will be six Solomon-Brunger sulphite digesters two wet machines, and two paper machines, 100 inches wide each, for making paper specialties and fine papers. *The Paper Mill and Wood Pulp News*, *21*, No. 29:30 (July 21, 1898).

The Hollingsworth & Whitney Company are

increase their plant at Winslow, Me., by the
lding of a big sulphite pulp mill . . . It has been
ided to build a mill which will have a capacity
sixty tons per day, although it is not the inten-
n to make more than half that amount now.
e mill is to be larger to provide for
future needs of the company. *The
per Mill and Wood Pulp News*, *21*,
. 34:29 (August 25, 1898).

Keeseville, N. Y. . . . The J. and
Rogers Company's pulp mill con-
nes upward of 35,000 cords of spruce
od annually. The furnace wood
essary to keep the wheels of the
l moving approaches 12,000 cords. To
emble this vast quantity of wood
the millside requires the services of nearly
men, upward of 125 teams, and many
dding horses . . . This pulpwood is cut in
ious places up and down the rivers (the two
ers Ausable) and is floated thence to
sable Forks. *The Paper Mill and Wood Pulp
ws*, *26*, No. 4:12 (January 24, 1903).

Appleton, Wisconsin, January 28.—The first
king was taken off the No. 1 digester at the
v mill of the Green Bay Fibre and Paper
mpany, Green Bay, Saturday and an excellent
lity of fibre was turned out. The second
ester will be blown in this week and the mill
l be operating to its full capacity of twenty-
e tons a day by the end of this week. *The Paper
ll and Wood Pulp News*, *26*, No. 5:2 (January
1903).

The plant of the Munising Paper Company
Munising, Mich., the foundations for which
about completed, will consist of a 75-ton
phite mill, with three digesters 15 by 47 feet,
l a three-machine paper mill, to be equipped
h two large Fourdrinier machines and one
urdrinier and cylinder combined . . . This will
a steam mill in the matter of power, the power
tion being placed directly between the sulphite
l paper mills and the mill will be electrically
ven. *The Paper Mill and Wood Pulp News*, *26*,
. 9:78 (February 28, 1903).

Glens Falls, N. Y., May 16, 1904—It was
nounced here today that, as a result of the
ning of the Lewis water storage bill by the
vernor, the financial interests identified with
Finch, Pruyn and Co. will immediately begin construction of a mammoth wood pulp and news mill.

Finch, Pruyn & Co. have been for years one of the largest lumber concerns in Northern New York. They control practically all the spruce supply in the Adirondacks, outside of that owned by the International Paper Company. The company owns the water power on the Warren County side of the Hudson River at Glens Falls, but because of the decrease in that flow had deferred the building of the paper plant until the water storage question was settled. *Paper Trade Journal*, *38*, No. 20:5 (May 19, 1904).

Glens Falls, N. Y., July 25, 1904—Finch, Pruyn & Co., just incorporated with a capital stock of $3,000,000, will begin at once the construction of new paper mills with a daily capacity of 75 tons and pulp mills of sufficient capacity to supply their own wants. They own over 100,000 acres of woodlands in Hamilton, Essex, and Warren Counties, and by conducting their lumbering operations under scientific forestry methods, they estimate that they have an ample supply of pulp wood from their own lands for generations to come. *The Paper Trade Journal*, *39*, No. 4:4 (July 28, 1904).

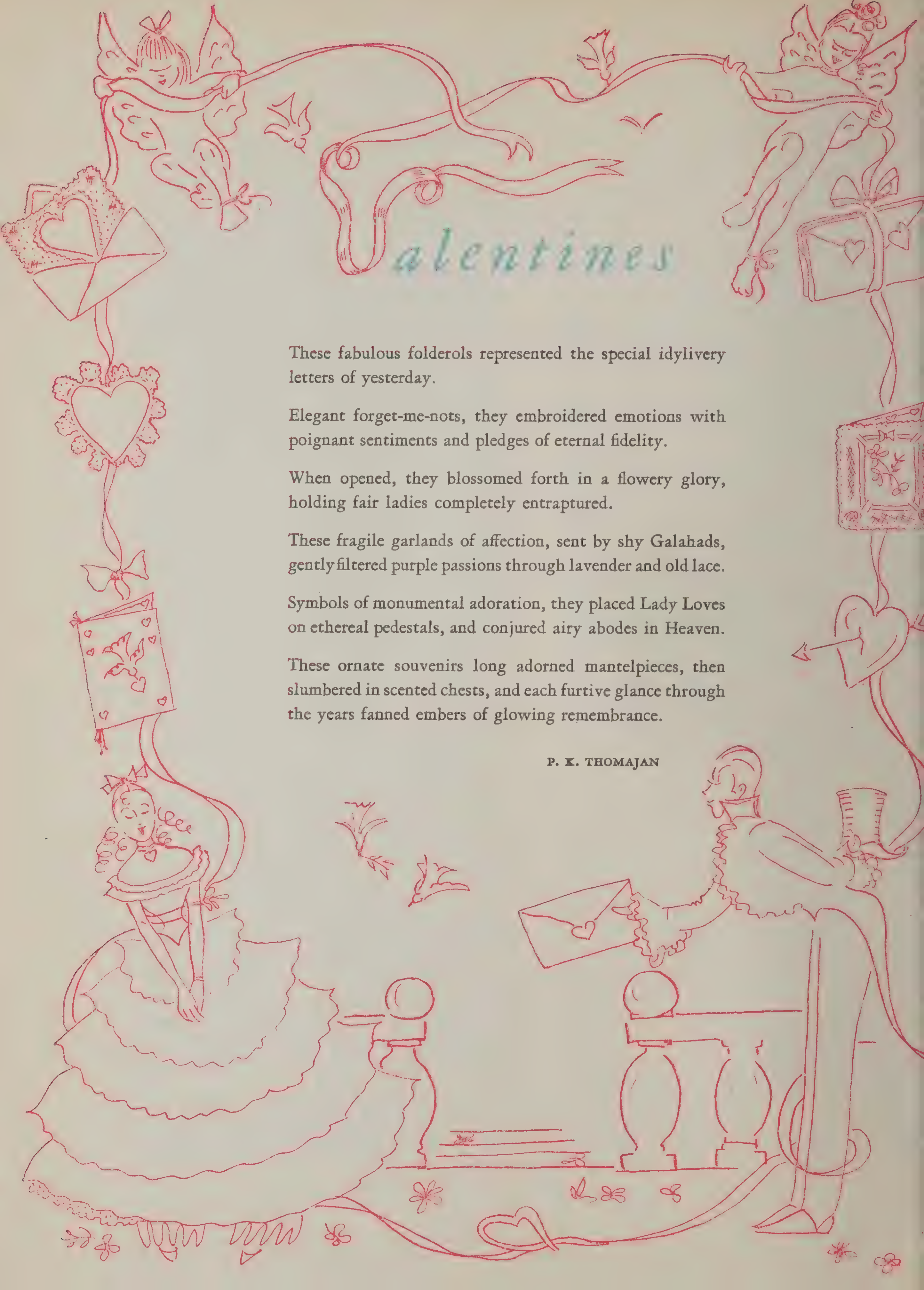
Grand Rapids, Wis., July 25, 1904—With the completion of the new mills of the Consolidated Water Power and Paper Company, much interest has been stimulated in the paper trade and mechanical fields on account of the many new appliances of power here installed.

The first product of the electrically driven paper machines was turned out about six weeks ago, and so perfect and harmonious was everything that in less than forty-eight hours, the mill was running to its full capacity and has so continued.

Electric transmission of power is the novel feature of equipment, and here it is truly developed and applied to a marked degree of perfection.

The officers of the company are as follows: president, F. McKinnon; vice president, W. D. Connor; treasurer, Isaac P. Witter; secretary and manager, George W. Mead; superintendent, C. G. Oberly; electrician, V. D. Simons. *The Paper Trade Journal*, *39*, No. 4 (July 28, 1904).

The new mill of the Munising Paper Company, Munising, Mich., was started this week. *The Paper Trade Journal 39*, No. 18:18 (Nov. 3, 1904).



Valentines

These fabulous folderols represented the special idylivery letters of yesterday.

Elegant forget-me-nots, they embroidered emotions with poignant sentiments and pledges of eternal fidelity.

When opened, they blossomed forth in a flowery glory, holding fair ladies completely entraptured.

These fragile garlands of affection, sent by shy Galahads, gently filtered purple passions through lavender and old lace.

Symbols of monumental adoration, they placed Lady Loves on ethereal pedestals, and conjured airy abodes in Heaven.

These ornate souvenirs long adorned mantelpieces, then slumbered in scented chests, and each furtive glance through the years fanned embers of glowing remembrance.

P. K. THOMAJAN

HONORS TO THESE MEN

A page of bouquets handed to men who have contributed to the development of the art and practice of papermaking past and present.

TO HUGH J. CHISHOLM —for having become president of a large pulp and papermaking firm in Maine in 1912—when only 26 years old—shortly after receiving a law degree at Harvard (1911)—having previously graduated from Yale (1908), a position that he not only filled well at the time but which has expanded during the ensuing years into even broader horizons—the operations in Maine today having a daily productive capacity of 400 tons of chemical pulp (sulphite and soda), and 500 tons of paper—there also being a mill in Ohio with a daily capacity of 120 tons; for his presidency of a light and water company (also in Maine), a position which dates back to his junior year in college and which was his actual start in business; for his varied business interests that include directorships of a couple of railroads, a terminal company, and a bank—even a dairy farm where Ayrshires have been bred for about 35 years; for his over-all industry activities, he having been active in the affairs of the American Paper and Pulp Association for many years and of which he is now a vice president; for his love of sports that found him as a member of Yale's polo team that played against Harvard in 1907 in the first American Intercollegiate Polo Match and in more recent years (up until World War II) traveling to far distant places, and sometimes in uncharted waters, on his yacht, the "Aras"; and then, too, for his numerous club memberships—definite indications each of them of his friendly and companionable disposition.

TO HARRY FLETCHER —for his nearly 40 years of active association with the pulp and paper industry of the United States—having been connected all of this time with a pulp and papermaking firm located in Michigan, that bears his family name, and historically which operated the first successful sulphite pulp (Mitscherlich) mill in this country, the pulp mill running for more than 50 years; for his vision and initiative, which spearheaded a movement that resulted in the formation of the Technical Association of the Pulp and Paper Industry—he serving for two years as the Association's first president (1915–1916); for his business discernment that prompted him to develop a functional cost-accounting method to give accurate costs of various grades of paper to be produced in a specialty paper mill—credited as being the first method of this kind to be used in the industry; for his part in the development of a high density bleacher (Fletcher)—a definite contribution to modern bleaching procedures; for his other business and civic activities down through the years—numerous and important—such as his participation, during World War I, as a member of the State of Michigan War Board—also Chief of Division of the American Protective League, and Staff Assistant of the U. S. Emergency Fleet Corporation; for his chemical engineering background—his formal training having been obtained at the University of Michigan—having graduated from that institution in 1907—going directly from college to the pulp and papermaking firm with which he has since been and still is associated—in 1913 becoming vice president and general manager, and in 1941 being elected to the presidency—the position he now occupies; TAPPI medal awardist in 1943.

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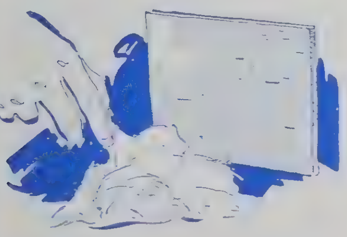

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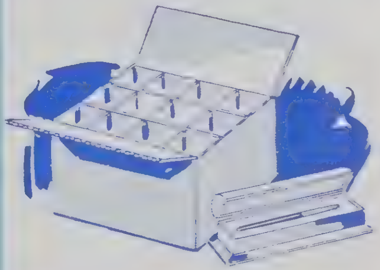

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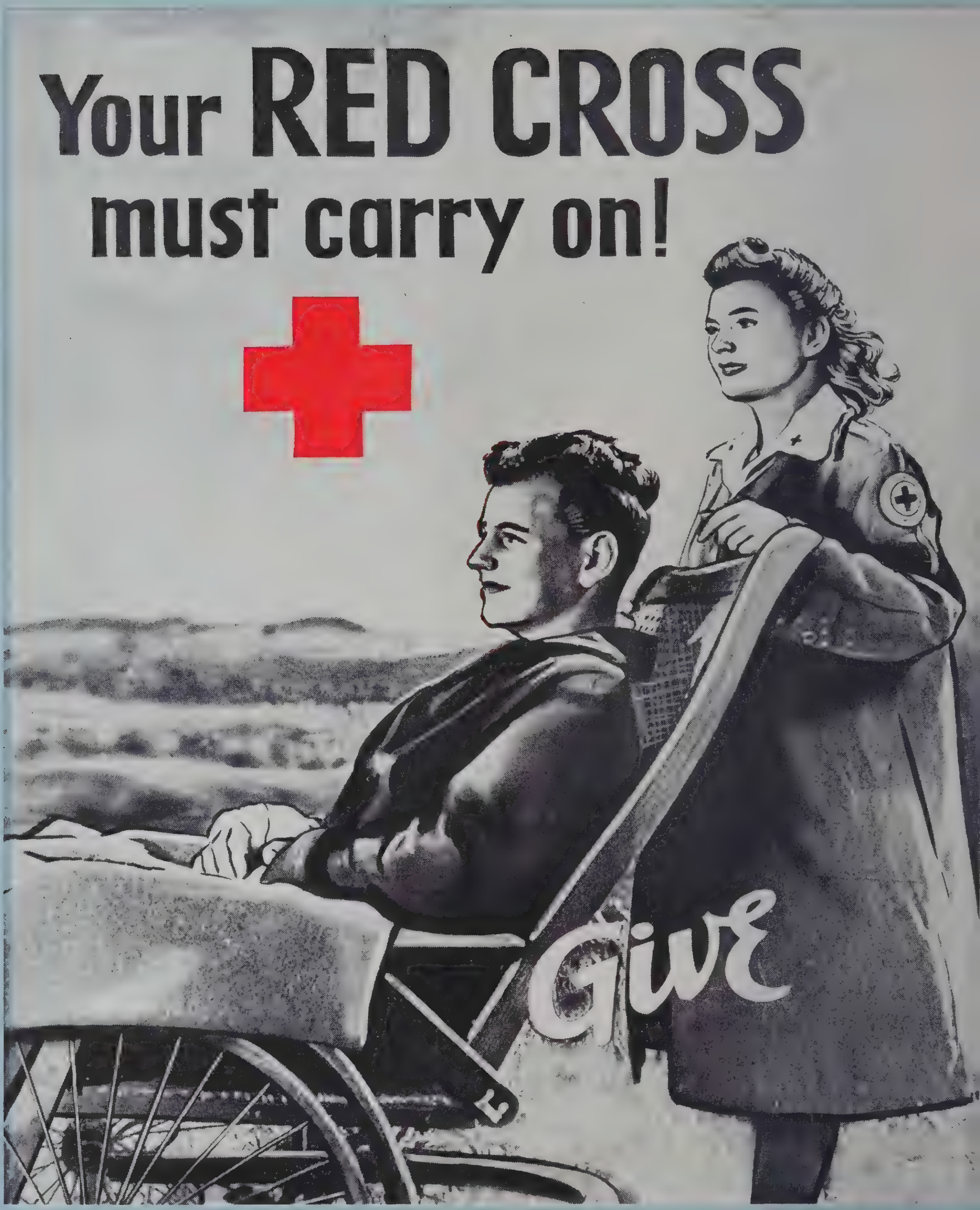
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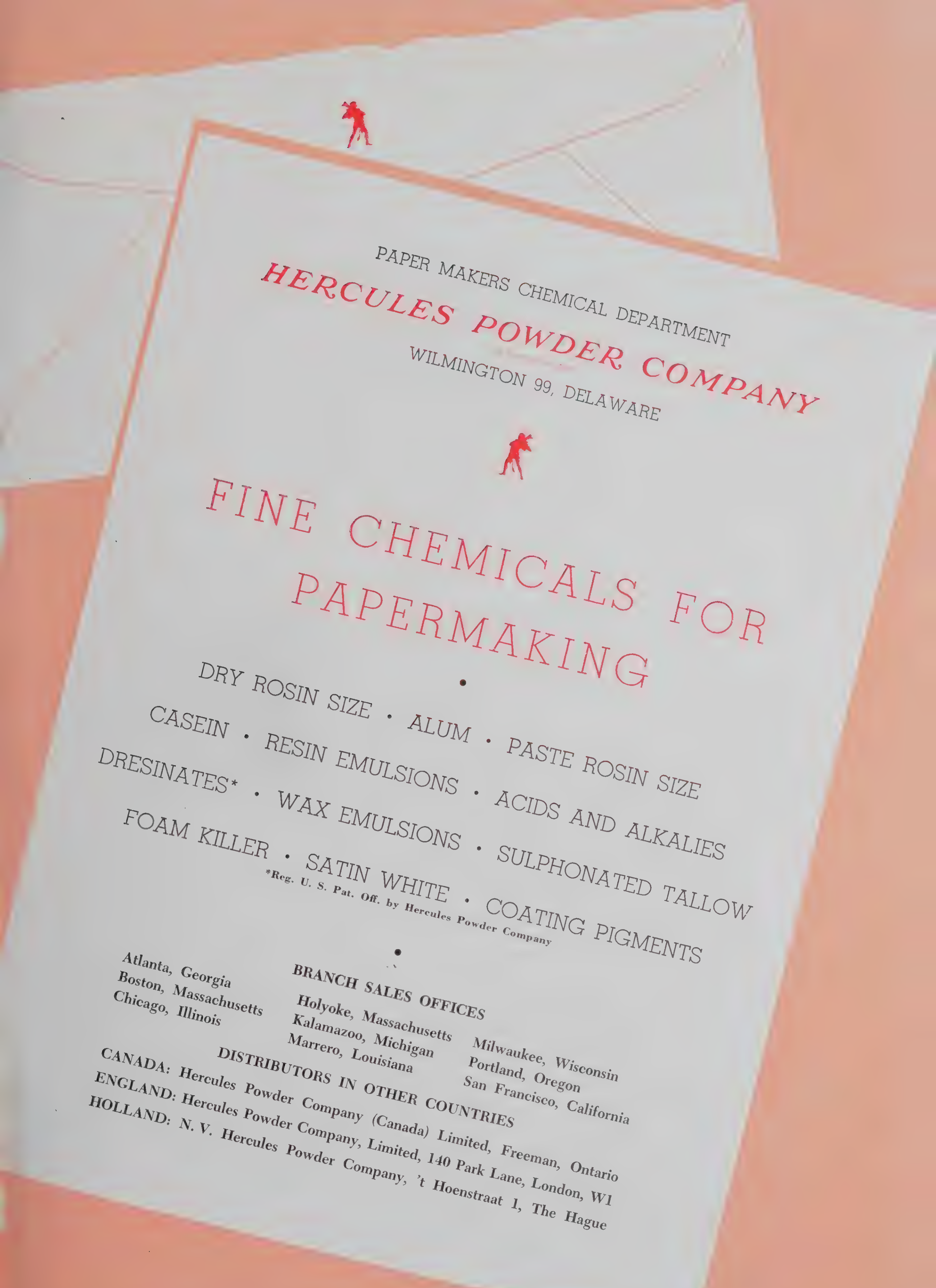

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ome Notes on Oriental and Occidental

PAPER and BOOKS

DARD HUNTER, LITT. D., B. LITT.

E INHERIT the English term “book” from the Middle English appellation *bok,* which turn was derived from the ancient Anglo- xon *boc.* To the Anglo-Saxons the word c was synonymous with *bece,* or beech, inas- ich as these peoples, as early as the third tury A. D., inscribed their runes upon strips sections of beechen wood. Before the in- tion of paper, 105 A. D., the Chinese wrote eir characters upon narrow strips of bamboo, m top to bottom. This selfsame top-to-bot- n formation, the direct result of writing on strips of limited width, remains to the sent day the writing style of the Chinese their brush calligraphy upon paper. The cient Egyptian, Roman, and Greek civiliza- ns wrote upon a thin material that was de by pasting together strips cut from the yrus sedge. Although the laminated sheets papyrus were a form of carpentry, rather n paper, we do inherit our word “paper” m the ancient Greek and Latin words, *uros* and *papyrus.* The Greek term *bub-* denoted the inner fiber of the papyrus nt, and writings on sheets of laminated yrus were known as *biblos;* in Latin the n was *biblia,* hence the name Bible. It is seen that our words for both paper and book were derived from terms that denoted materials formed of vegetable substance — papyrus and beech wood.

When the Chinese eunuch, Ts'ai Lun, in 105 A. D., made the first true paper it is only natural that he turned to the bark of trees and the fibers of plants for his raw materials; for centuries these same substances in their natural state had been used for calligraphy. The earliest Chinese paper was composed of mulberry bark (*Broussonetia papyrifera*), hemp (*Cannabis sativa*), and China grass (*Boehmeria nivea*). The mulberry fibers were used in their original state, but with the hemp and China grass the material had previously seen duty in the form of ropes, fishing nets, and woven cloth. From the very commencement of papermaking the workers were content to make use of materials that had been discarded by the mariner, the fisherman, and the housewife. This same condition exists at the present time as the “all rag” papermakers make use of castoff linen, cotton, and hemp cloth after it has served its useful purpose as clothing, bags, or other commodities.

It is interesting to try to formulate an imaginary picture of those first eventful days of papermaking carried on by Ts'ai Lun and his Chinese helpers working in the old walled city of Lei-yang, Hunan Province, at the beginning of the second century after Christ. As has been outlined, the original calligraphy of the archaic Chinese was written upon narrow strips of bamboo; but after many centuries of use the unwielding bamboo gave way to woven cloth as a writing material especially after the introduction of the camel's-hair brush, an invention attributed to Meng T'ien during the third century B. C.

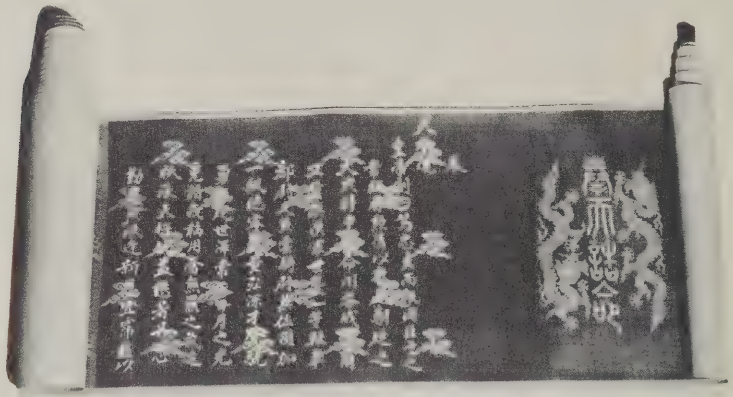


FIGURE 1. Woven cloth made an excellent surface for Chinese brush calligraphy, and the Chinese fashioned their writings into beautiful scrolls. This was the first form of book and was used in China as early as 200 B.C. (Paper Museum of M.I.T.)

Cloth made an excellent surface for the calligraphy of the Chinese, and they fashioned the material into beautiful scrolls (Figure 1). As there was considerable waste when the woven textile scrolls were cut and trimmed, it was natural that an ingenious artisan conceived the idea of beating the discarded cloth into fiber and forming the macerated substance into thin, flexible sheets that could also be used for writing. Cloth was expensive and even in ancient times, as at present, there was a desire to produce necessary and useful materials as cheaply as possible. It was probably the narrow strips of waste fabric trimmed from the edges of primeval manuscripts and documents that first suggested to the ever-practical Chinese mind the idea of making paper. Also it is possible the Chinese conceived the thought of matting and interwinding the fibers into sheets of paper through their knowledg
of feltmaking, a craft that even antedate
weaving.

In experimenting with the bits of discarde
cloth, it was logical that the Chinese worke
first wetted the material and then beat it unt
each scrap of textile had been reduced to fibe
This was accomplished by hand with mort
and pestle, the most elementary form of m
ceration. The beaten fibers were probab
thrown into a vat filled with water, an
when Ts'ai Lun saw the mi
ute filaments floating on th
crest of the water, as win
blown seeds of the milkwee
float upon the surface of
brook, it no doubt suggeste
to him the feasibility of li
ing the matted and tangle
film from the water's surfa
and transferring the leaf,
stratum, intact so that
might be dried in the su
The difficult task was
devise an implement capab
of picking up the fib
from the water and at the same ti
permitting the water to escape, leaving t
interwoven fibers in a thin, homogene
sheet of paper. This need brought fo
the invention of the papermaking mo
the implement that has remained throu
out the centuries the most essential t
in forming paper by hand, and upon
principle of which the modern pap
machine is founded. To the papermal
the mold is as important as the loom
to the weaver.

The "Wove" Mold

Inasmuch as no paper is in existence fr
the first forty-five or fifty years after its inv
tion, it is only possible to surmise the c
struction of the original molds. It is lik
that the first mold, as conceived by Ts'ai I
and his servants, was nothing more tha
square of coarsely woven cloth held withi
four-sided bamboo frame. This type of m
could have been successfully used in mak

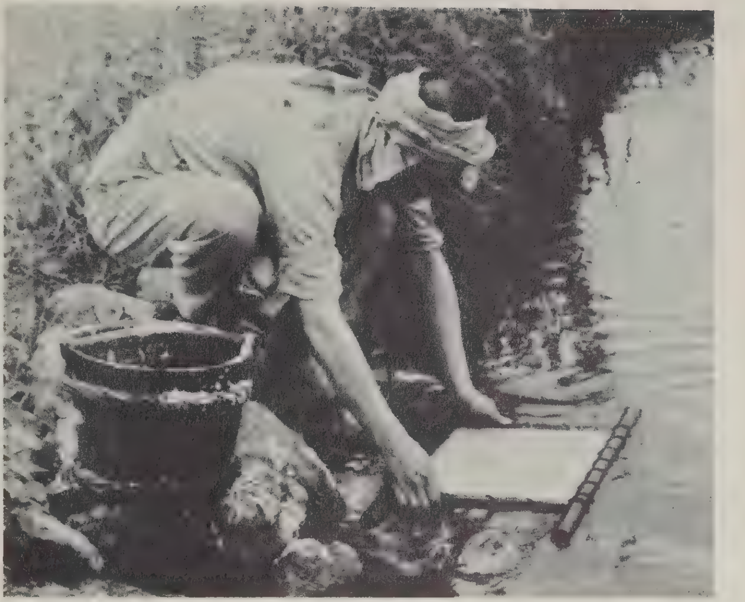


FIGURE 2. In early Chinese papermaking the wove cloth mold may have been floated on a stream and the macerated fiber poured upon the mold's surface. After drying, the layer of matted fiber was a sheet of paper. (Photograph: Springer Pictures, Inc.)

er by two distinct meth- : In the first method mold could have been ped perpendicularly into water upon which the cerated fibers floated and ught up horizontally *der* them, lifting the tted fibers as in a e, allowing the water to in through the meshes of cloth. In the second thod the mold could have n held flat and the fibers *ured* upon the woven cloth terial (*Figure* 2). In either e the mold with the thin posit of matted and felted ers adhering to its surface s placed in the sun for dry- . After the moisture from the sheet had porated, the paper was easily stripped from mold. The warp and woof of the cloth- ered mold left impressions in the paper, in same manner as watermarks are formed in sent-day handmade paper.

The "Laid" Mold

t is not possible to determine the precise e of the introduction of the "laid" mold China (Figure 3). The earliest paper dis- ered by Sir Aurel Stein and Dr. Sven Hedin ws clearly the impressions of molds of this e of construction, but s paper does not date m the first half century he craft. My contention is t the "wove" mold was bably the first form used l the "laid" mold was an er invention, following the ove" mold after it had been use for a half century or .

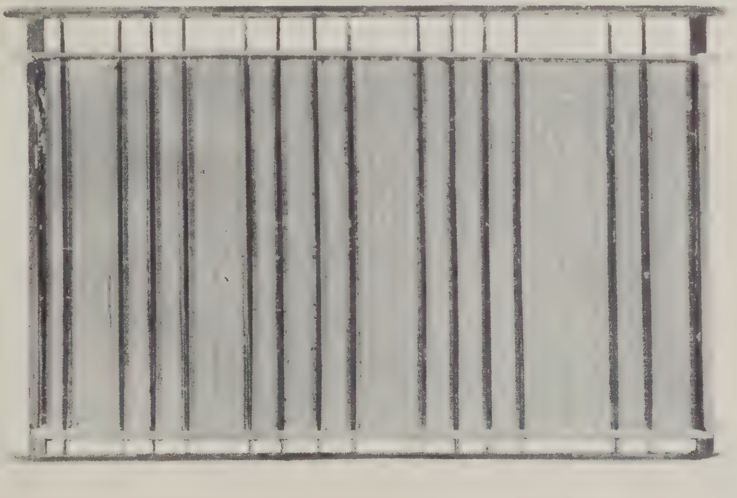


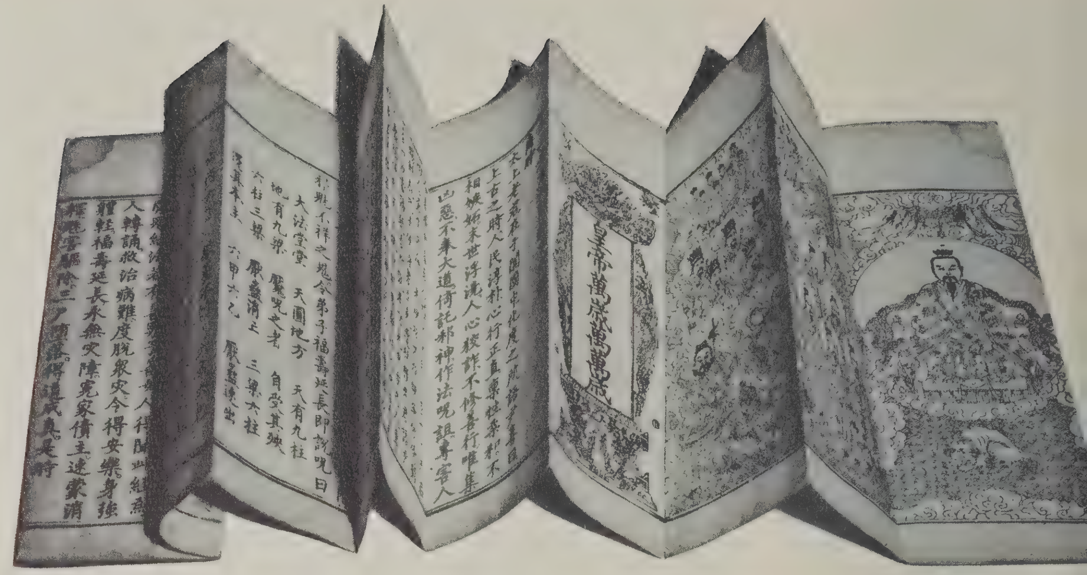
FIGURE 3. The "laid" paper mold was invented in China about 150 A. D., and remains the standard type of mold used in the Orient. The "laid-lines" are made of bamboo and the "chain-lines" of horsehair. European handmade paper molds are the outgrowth of this type of Chinese mold, also the modern paper-machine is founded upon it. (Paper Museum of M.I.T.)

he entire development fpapermaking is so closely nected with mold con- uction that it is only ough a study of molds that the long history of paper is revealed. Without a knowledge of mold-making throughout the centuries in all parts of the world, it would not be possible to arrive at definite conclusions regarding the formation of ancient Oriental papers.

Chinese Book Papers

After the invention of paper the rolled scrolls of cloth that had formed Chinese books since about 200 B. C. gave way to the more practicable paper, but the same general style of rolled book continued. The scroll

FIGURE 4. The folding style of book was originated by the Chinese in the tenth century and consists of simply creasing or folding a rolled scroll into sections. This type of book came into use after the invention of paper and after the original use of woodblocks in printing. (Paper Museum of M.I.T.)



type of book, made either of cloth or paper, was not well adapted for ready use, and reading from such manuscripts presented no little inconvenience as the monks were obliged to unroll and roll the scrolls as they chanted their Buddhistic prayers and mantras. Even though the scrolls were unwieldy and inconvenient they remained in use in China for almost ten centuries after the invention of paper.

It is strange that the folded, or accordion, form of book was not earlier conceived by Chinese as the invention of this type of volu involved only the creasing of a scroll i folds, as shown in *Figure* 4. This type book came into use after the Chinese had vented woodblock printing, and its form well adapted for this purpose; the sheets paper were pasted together at the edges construct the necessary length. Because of transparency only one side of the paper ceived an inked impression. The anc Chinese workers were capable of making usually large sheets of paper, but not of ficient dimensions for their folded books in many instances the books are dozens feet in length. The famous "Diamond Sut printed by Wang Chieh in 868 A. D., found by Sir Aurel Stein in 1907, is a ro book and measures sixteen feet in length twelve inches in width. (The largest sh of Chinese paper in the Paper Museum the Massachusetts Institute of Technology from the Ming Dynasty [1368-1644] and m sure 48 by 84 inches.) The folded form book, a direct descendant of the scroll, c tinues in use to the present day for most the Buddhistic writings.

In China the stitched book followed folded volume; for this improvement it only necessary to sew or stitch a folded t

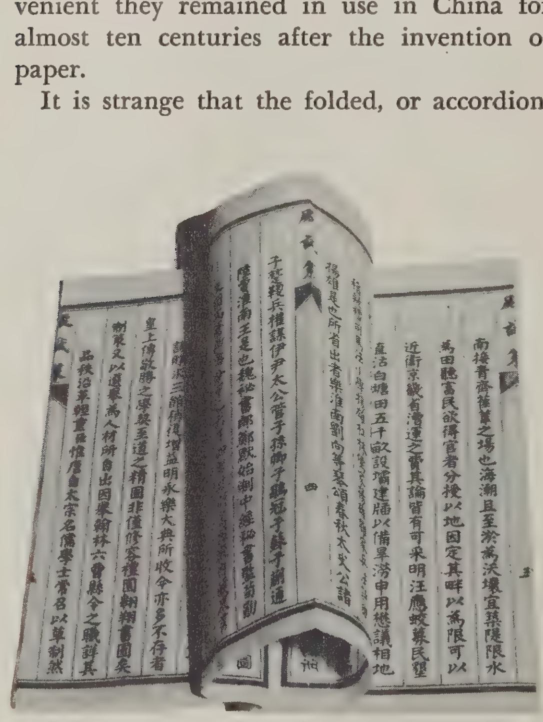


FIGURE 5. The stitched book of China was an outgrowth of the folded book. This specimen is one of two copies printed in the Imperial Palace, Peking. (Paper Museum of M.I.T.)

book at the two edges rallel with the fold (Fig- 5). As before men- ned, the Chinese have ver used but one side the paper for their writ- or printing, due to the n, absorbent quality of the terial that would bear cal- raphy (*Figure* 6) or an ed impression from wood- cks only on one side (*Fig- s* 7-8). This type of book- ding, so essentially Chi- e, is now known as rench-fold," a misnomer ilar to "India paper," dia ink," "rice-paper," l other deceiving terms.

The Earliest Printing Upon Paper

The earliest block printing s executed by Chinese rkers in Japan between and 770 A. D. This was first printing upon paper be accomplished in the rld. This earliest of all nting was in the form Buddhistic prayers, or *rani,* but it is not known ether the printing blocks re made of wood, stone, or tal as no original block has n found. It is definitely blished, however, that the paper was com- ed entirely of hemp (*Cannabis sativa*) and molds upon which the paper was formed e of the "laid" pattern; no sizing was used he paper, and it remains to this day the e tone as natural hemp. The small strips paper used in printing the prayers measure n 16 to 22 inches in length and are ap- ximately 2¼ inches in width (*Figure* 9). no instance has a deckle edge been found n the paper; in fact, the Chinese always away the deckles before printing upon the er. The Chinese were the first printers to number the pages of books, the numbers being along the folds in the center of the sheets as shown in *Figure* 10; the Chinese also made use of wide margins for the purpose of the reader's notes, but in Chinese books the widest margins are at the top of the pages, the opposite of the European custom (*Figure* 11).

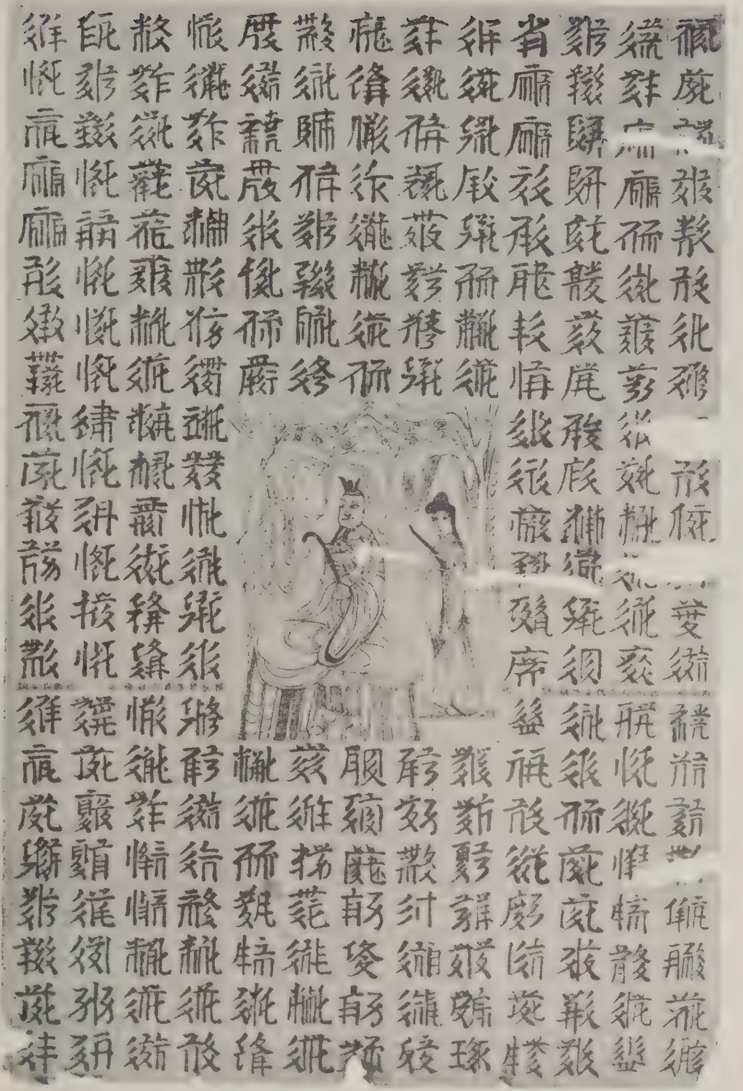


FIGURE 6. A manuscript on paper written in the characters of the Hsi Hsia tribe, based on Chinese characters. The paper is made of mulberry bark and dates from the eleventh century. The paper measures approximately 24 by 32 inches. (Paper Museum of M.I.T.)

European Molds

When papermaking was introduced into Spain during the twelfth century, it is probable that the European workmen at first

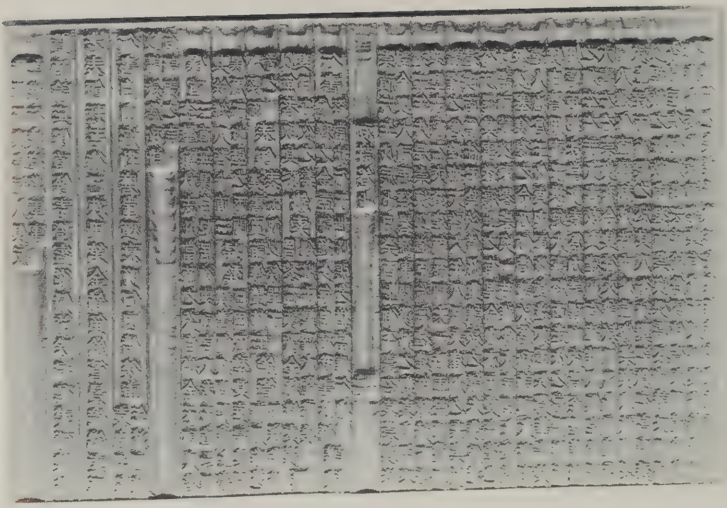


FIGURE 7. A wood-block used in printing two pages of text of a Chinese book. After being printed, each sheet is folded in the center and forms the pages of a stitched book. (Paper Museum of M.I.T.)

made use of the bamboo type of mold that had been conceived in China a thousand years previously. It was not long, however, before the European artisans had substituted metal wires (*Figure* 12) in place of the bamboo and horsehair, since bamboo was not readily obtained in the Occident. Also, in place of the Oriental flexible "laid" mold-cover that was removable from the mold-frame, the European papermakers adopted the rigid mold as more suited to the formation of rag fibers into sheets of paper. The Europeans used a fence, or "deckle," to keep the newly formed paper within bounds, just as had been the practice in the Eas

In transplanting the "laid type of mold from Asia t Europe the same pattern c mold-cover was retained, bu the papers of the West wer impressed with the "laid-anc chain" marks of metal wire while the papers of the Eas had been impressed with th "laid-and-chain" pattern c the bamboo or grass reed stitched together with anima hair, cotton, or silk. In bot the Orient and the Occ dent there is a vast diffe ence in the number of "laic lines" to the inch; also there is no un formity as to the distance between the "chain, or stitched, lines.

In the paper used in printing the Gutenber Bible (1450-5), there are about 28 "laid-lines to the inch, while in some of the paper use by Peter Schöffer, Gutenberg's successor, the are 24 lines to the inch. Molds that had wires to the inch were in use at the Joh Tate mill, the first to be established i England, in 1496. The paper used b Erhard Ratdolt at Augsburg, in 1490- shows from 32 to 38 lines to the inc while the paper used by Berthol Ruppel in Basle has but 20. The "chai lines," or sewing wires, varie greatly also and are foun spaced from half an inc to fully two inches apa From these few observatio it will be seen that locatio or period has little bearing o the number of lines foun in old papers; there is no po sible way of cataloguing o indexing these impressions i paper so that a particular tim or place of origin may b determined. Ancient pape both Oriental and Occide tal, must be placed by i general characteristics an

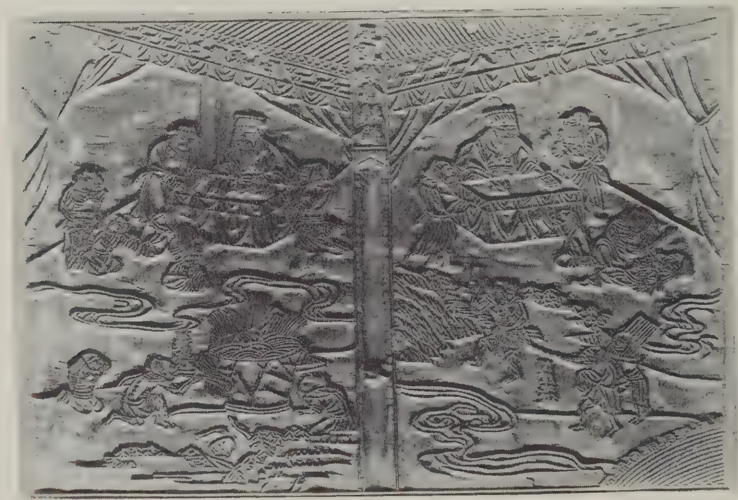


FIGURE 8. A pictorial wood-block used in printing two pages of a Chinese stitched book. The title and the page number appear in the center where the paper is folded. (Paper Museum of M.I.T.)

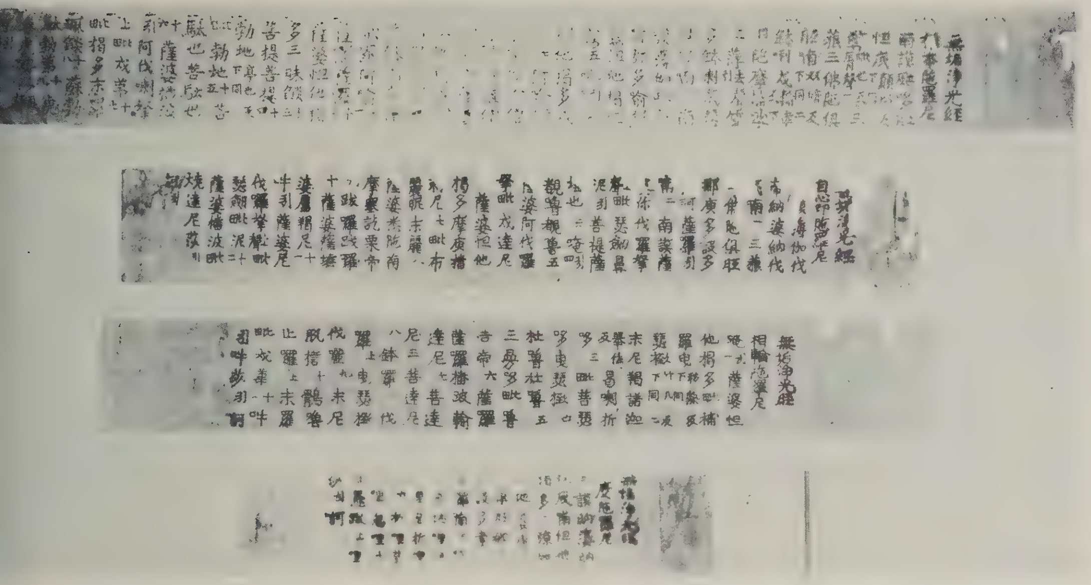


Figure 9. The four *dhāranī* executed in Japan by Chinese scholars. This printing was executed in the eighth century and is the first printing in the world on paper. The material used in making the paper was hemp. (Paper Museum of M.I.T.)

by a list of rules that can be given as
llible.

The Sizes of Old Papers

ifteenth century European paper made
n linen and cotton rags had a much rough-
surface than was prevalent after the in-
luction of the wooden glazing-rolls about
year 1540. The fifteenth century book
ers, however, have never been excelled
durability and lasting quality. They re-
n to this day a perpetual monument to
early papermakers who made them. Per-
s the largest size sheet of paper made in
ope during the fifteenth century for book
nting was that used by Bernhard Richel
was printing in Basle as early as 1472. This
er measures 18¾ by 27 inches, trimmed,
was employed in imprinting the fine edi-
of *Gratianus: Decretum,* in 1476. The
kle edges of this paper, as in practically
incunabula, have been cut off as the fif-
th century papermakers rightly regarded
kle edges as imperfections in the making
ne paper, and not as something to be cher-
d and preserved as is the case today.

he paper used in printing the well-known
tchronik (*Nuremberg Chronicle*), 1493, measures 17 by 24 inches, trimmed. There are more copies of this book in existence at the present time than any other fifteenth century volume printed in Germany. In this Chronicle is shown a picture of the Ulman Stromer paper mill, just outside the walls of Nuremberg. Stromer's manuscript diary records a labor strike that occurred in this mill in 1391—the earliest strike in the history of papermaking. From an examination of hundreds of volumes printed during the fifteenth century it is ascertained that the sizes of the papers used had considerable variation, with the approximate sizes of 16 by 22 and 18 by 26 being the favorite dimensions.

In later years the sizes of the sheets of paper remained much the same as they had been during the cradle days of printing. To cite several examples: the paper used by Thomas Roycroft in printing his Polyglot Bible, London, 1657, measures 17½ by 21½ inches. The fourth edition of this Bible, with the same size of paper, was one of the earliest books printed in England to be sold by subscription and during the first two months of the solicitation 900 copies were taken, at ten pounds each. All of the types used in printing the nine different languages were cut and cast

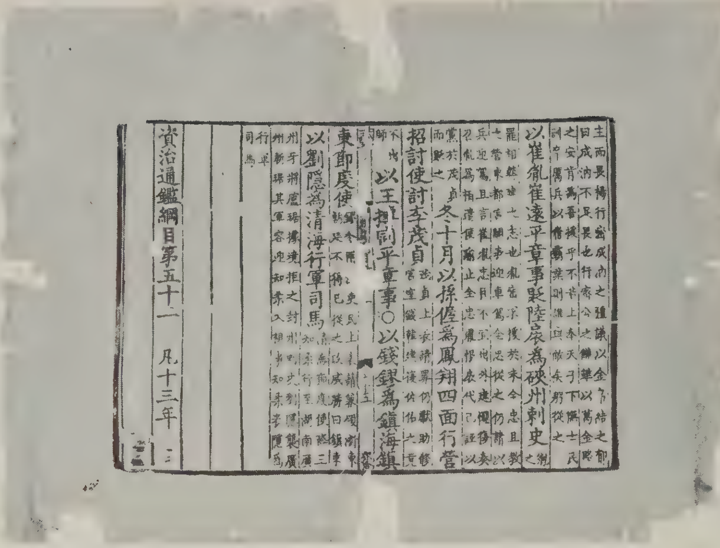


FIGURE 10. Two pages from a Chinese book dating from the Sung Dynasty (960-1126). The paper is made from bamboo and mulberry bark fibers. (Paper Museum of M.I.T.)

in England, and for the achievement Charles II bestowed upon Thomas Roycroft the title, "King's Printer of Oriental Languages."

A little over a century after the Roycroft Polyglot Bible was issued, another renowned Bible was undertaken in England, by the eccentric John Baskerville of Birmingham. This Bible appeared in 1763 in a folio on paper measuring in the full sheet, 19½ by 24½ inches. Baskerville's press was moved from Birmingham to Cambridge for the printing of this magnificent Bible, but unlike the successful plan of Thomas Roycroft, the promoters of the Baskerville Cambridge Bible could find onl 264 subscribers for the 1,25 copies that had been printed The failure of Baskerville t dispose of this edition drov him to borrow 2,000 pound to assure the completion o the great task. John Baskerville was not discouraged however, for in 1769 in hi home city of Birmingham h printed another edition of th Bible that was a financial success. This Bible was smalle in size, the full sheets o paper measuring 16½ b 20½ inches.

In our own country, during the eighteent century, the sheets of paper used in boo printing also varied in size; in many instance the books were imprinted upon Europea made paper. The Germantown Bible of 174 printed by Christoph Saur, is upon pape measuring about 15 by 19 inches. This wa the first Bible issued in America in a Europea language. Here again, we find there was di ficulty in selling the edition as it require twenty years to dispose of the comparativel small printing of 1,200 copies. Of this editio of the Bible in German only about 150 copi exist today. The second ed tion of the Bible from th same press appeared in 176 In 1777 the third edition co sisting of 3,000 books ha been printed and was read for binding, but the Batt of Germantown was bein fought and the British so diers took possession of th unbound books and used th strong, all-rag paper for gu wadding.

In 1791 Isaiah Thom of Worcester, Massachusett printed his handsome quar Bible (size of page 9¼ b 11¾ inches), and for th

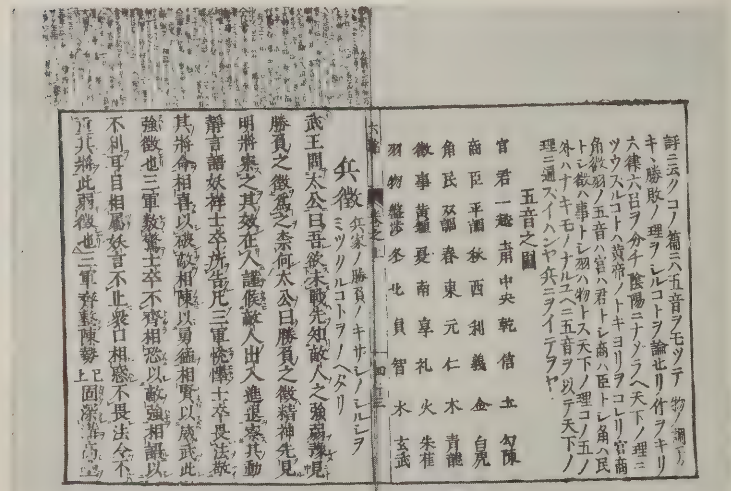


FIGURE 11. Two pages of a Chinese stitched book from the period of Shun Chih (1644-1662). The top margins were left wide so the reader could inscribe his notes; this plan was also adopted by European printers, but in the books of Europe the widest margins were at the bottom of the pages.

chievement Benjamin Franklin gave the Wor-
ester printer the title, "The Baskerville of
merica." The price of this Bible was $7.00 a
py, and to make subscription less difficult
r the religiously minded country people
homas advertised: ". . . the publisher will
ceive half the sum in wheat, rye, Indian
rn, butter, or pork, if delivered at his store
Worcester, or at the store of himself and
mpany in Boston, by the 20th day of
ecember 1790."

he Present-day Handmade Paper Industry in the Orient and the Occident

My research in the handmade paper mills
Europe and in the primitive papermaking
calities of Mexico and
ntral America was accom-
ished previous to the first
rld war while my investi-
tions concerning the bark-
pers of the Pacific Islands,
well as the papermaking in
l countries of Asia, were
dertaken prior to the out-
eak of the second world
nflict. It has been my
ivilege, therefore, to have
n the small native paper
lls before they had disin-
grated through the emer-
ncies of war or become con-
minated by outside influ-
ce. Even previous to the
ent war, papermaking by
traditional hand process
d ceased to exist in south-
Siam (*Figures* 13-14);
Tonkin and Annam, Indo-China, the
per-machine had almost completely elimi-
ed the old craft of forming paper in hand-
lds, except in the "villages du papier" of
-Thai and Lang-Buoi, near Hanoi, Ton-
. The Japanese, expert and exacting
permakers since the seventh century, adul-
ated their handmade paper in pre-war
ers by mixing foreign wood pulp with their
unsurpassed mulberry, mitsumata, and
pi barks.

In India the paper-machine has been in use since the seventies, but under the guidance and sponsorship of the great leader, Mohandas K. Gandhi, the hand process has been revived in a half dozen provinces and today Indian handmade paper finds use in book and magazine printing, as well as for exercise paper in many of the native schools. In China, where paper had its inception in the second century A. D., there has been but little change in the handmade paper industry and there are probably now more workers engaged in this trade than in previous years. As an example of the prodigious proportions of Chinese papermaking by hand the single province of Chekiang need only be cited: In this province, in 1936, there were 24,473 individual cottage paper mills, employing 126,852 persons, a tremendous multitude of workers when compared with the number of employes in all of America's vast machine-made paper industry. The handmade paper produced in Chekiang in 1936 (the latest figures available) amounted to the enormous quantity of over nineteen million reams. This paper was made from bamboo, straw, and bark.

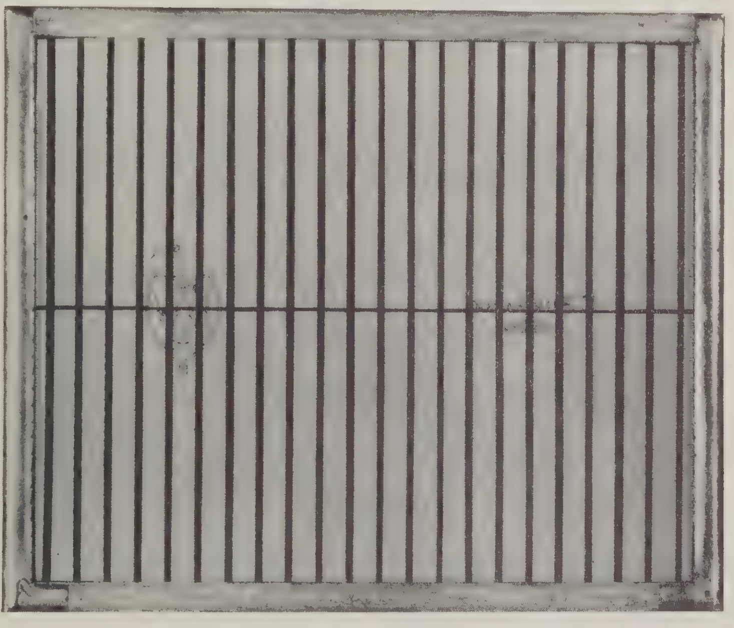


FIGURE 12. The wire "laid" mold of Europe was founded on the ancient Chinese bamboo "laid" molds as shown in Figure 3. This mold is of American make and was originally used in the Caleb Burbank paper mill, Central Massachusetts; it is watermarked with the seal of the state of Massachusetts, and the date 1804. Having no backing wires this mold would be rightfully termed "antique laid."

During the late war the Chinese manufac-

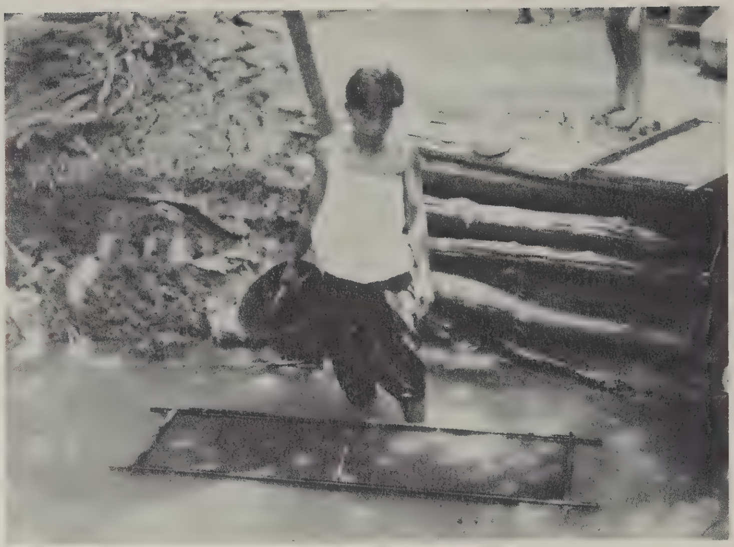


FIGURE 13. The Tym Niltongkum paper mill in Bangsoom, Siam. The mold is floated on the stream and the paper stock poured upon it. This is the technique of Tibet, Burma, Nepal, and Siam and is probably the oldest method of making paper, dating from the second century. (From: *Papermaking in Southern Siam,* by Dard Hunter, 1936.)

tured great quantities of paper by hand for ephemeral purposes; the use of this paper in the printing of newspapers and pamphlets had a decided influence in promoting unity among the various factions. With the interval of peace it is the desire of the Cooperatives of China (*Gung Ho*) to carry on with the making of paper on a vastly enlarged scale. It is hoped that the handmade paper industry can be developed to such an extent that each village unit in the papermaking districts will be able to produce at least 2,000 pounds of paper each day. The material for this common paper would be ba
boo and it would be suita
only for workaday printing
newspapers, magazines, pa
phlets, educational bookle
and other similar publi
tions. In greatly popula
countries like China and
dia, where labor is plenti
and cheap, but where mach
ery is expensive and pra
cally impossible to obtain,
is justifiable and feasible
manufacture cheap handma
paper on an extensive co
mercial scale. Through s
a course the lowly na
people would have at le
limited quantities of paper, whereas
they relied entirely upon the paper-mach
to supply their humble needs they would
entirely devoid of paper. (During the
1937 the per capita consumption of paper
the United States was 248.2 pounds; in Ja
for the same year sufficient paper was ma
factured to supply each person in the isla
empire with 23.6 pounds; in India 1.1 pou
and in *China, one-half pound.*)

It will be a number of years before Chin
able to manufacture sufficient cheap, unrefi
handmade paper even for their own requ
ments, but it is hoped
eventually the Chinese
consider making *fine* gra
of handmade papers for
port. Previous to the
the Japanese were shipp
quantities of handmade pa
to Europe and America,
these papers were of such
quality, or possessed
aesthetic features, that
did not in any way
pete with the product
the paper-machine. A
from economic necessity,
is no advantage in mak
anything by hand un
it can be made better

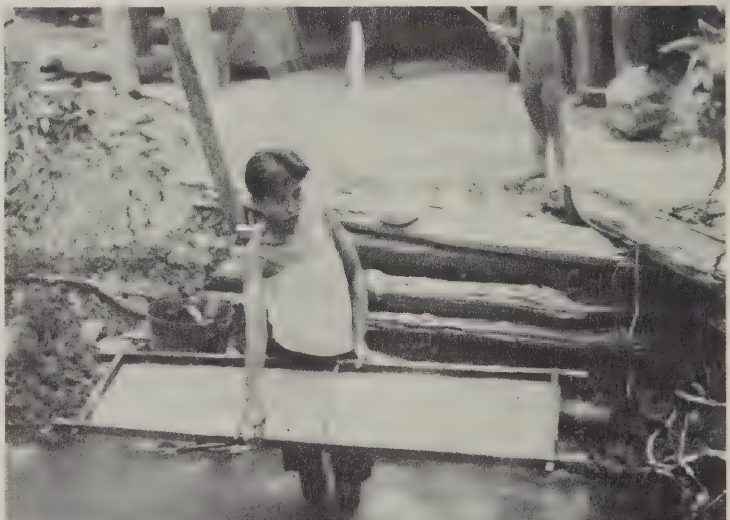


FIGURE 14. The same Siamese worker shown in Figure 13. After the mold was filled with stock it was agitated while floating on the surface of the stream. The paper is allowed to dry upon the mold so many molds are required. This sheet of paper measures about 16 by 60 inches; the paper is stained black and is used by the Buddhist priests in the temples of Siam.

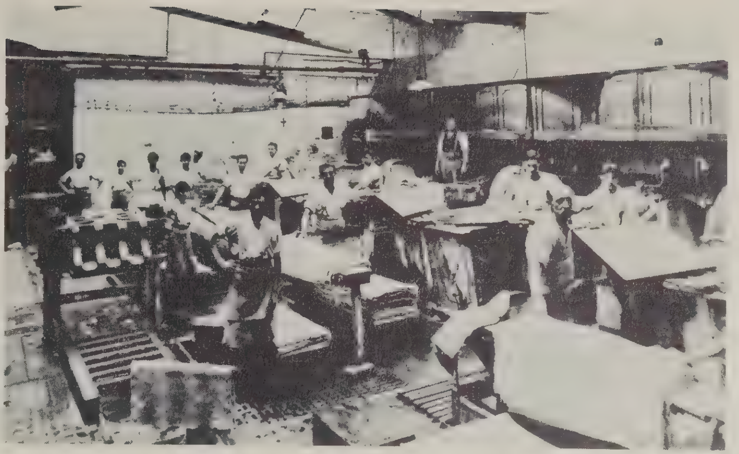


FIGURE 15. The interior of a modern English handmade paper mill, showing the various appliances.
Courtesy: The Eynsford Paper Mills, Eynsford, Kent, England.

re artistic than is possi- by machine. The Chinese sess greater skill and have a ner artistic sense than the panese; also in China they e the same fibrous plants Japanese employed in king the papers they ex- ted in pre-war years. Most the fine and noble char- eristics that are so abun- tly held by the Japanese e bestowed upon them ny centuries ago by the erior Chinese; on the er hand, many of the aggressive and offen- qualities of the Japanese are the direct lt during the past hundred years of Euro- n and American influence.

uring the Ming period and even in later es the Chinese were making papers that e superior in durability and technical sse to any papers produced in the Orient. uld the industrious Chinese craftsmen n turn to the making of fine paper such they fabricated in centuries past, there ld be an opportunity for them to develop xclusive export trade of considerable pro- ions. It is hoped that the Chinese will tually endeavor to revive the making of ly fine handmade papers, by so doing capture the rt trade that was monopo- l by the Japanese paper- ers previous to the late d war.

all of Europe at the ent time there are not e 20 handmade paper in operation, employing een 350 and 500 workers *ure* 15). For the most part mills have resumed the ng of book, drawing, ng, woodblock, water , engineering, and archi- tral papers, as well as a ed amount of fine sta- ry. During the war the handmade paper mills of England shared in the manufacture of military necessities. No handmade paper has been fabricated in the United States since the closing of the one-vat mill in Lime Rock in 1933. This group of old buildings from the middle nineteenth century, situated in northwestern Connecticut, remains today the only mill in America that is equipped for the making of handmade paper on a commercial scale. The mill is fitted with appliances brought from Wiltshire, England, and the original workers came to this country from Kent, England, where they had been handmade papermakers for many generations. *Figure* 16.

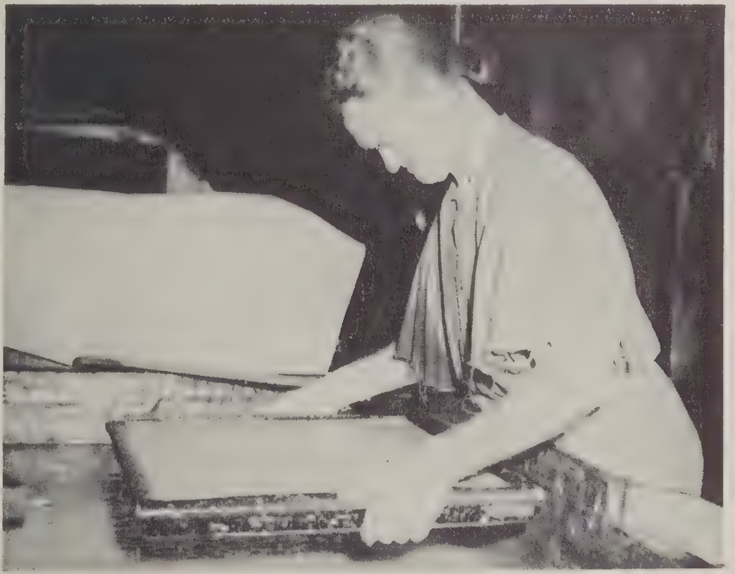
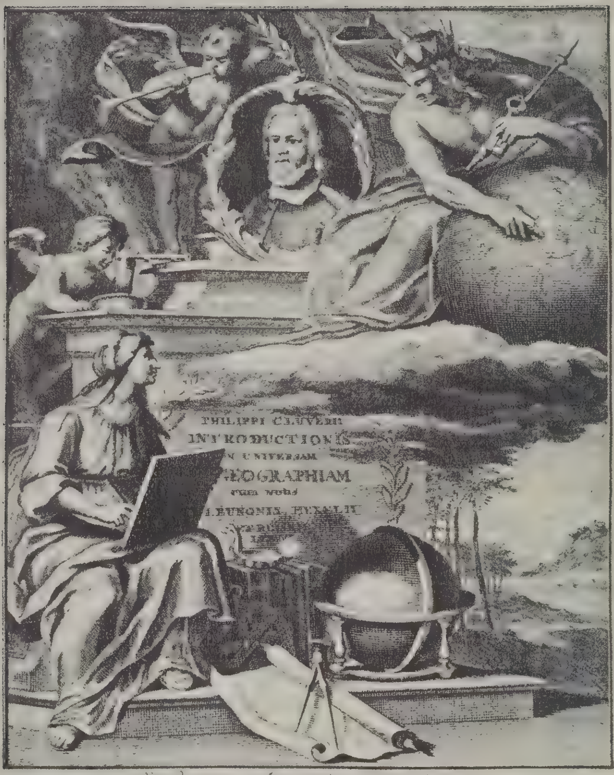


FIGURE 16. Robert Robertson, handmade papermaker, as he appeared in the historical section of the colored moving picture made by Springer Pictures, Inc.. for the Kenwood Felt Company. Mr. Robertson came to America from Kent, England in 1929 and was chief vatman for Dard Hunter Associates. The photograph was made in the vat-house of the Lime Rock, Connecticut, mill where handmade paper was made for a few years. This is now the only equipped handmade paper mill in America.



Venduntur AMSTELEDAMI
Apud . JOANNEM WOLTERS. A° 1697.

HE PAPER SITUATION IN BRITAIN

particularly as it affects the production

of BOOKS

BY HENRY QUENTIN FAICHNEY, D.A.A.

Lecturer on Advertising Administration and Reproduction
At the City of London College, London, England

THINK I can safely say that so far as
Paper Control is concerned, the war-
e battle cries 'Restrain, Restrict, and
ress' have been permanently replaced
the more peaceful slogans 'Relent, Re-
e, and Relax.' "

his pronouncement was made by Sir
ph Reed, Paper Controller for the Min-
of Supply, when he addressed the
er Makers Association on March 28th
year.

t about the same time, a letter to the
or of the *Daily Telegraph* pointed out
readers in May, 1919, had received
nty pages for two pence instead of, as
resent, only six pages for one and one-
pence and that all the previous wartime
rictions on consumption of newsprint
by that time been removed.

nd in Parliament, Mr. K. M. Lindsay,
P., had been telling the Commons how
44,000 standard books had gone out of print during the war and some 8,000 new manuscripts were awaiting publication, a total of over 52,000 works held up by lack of printing and binding facilities; more than three times the greatest annual output of prewar years.

These are but three viewpoints on the paper situation in Britain: that of the Government, the "Man in the Street," and the Book World. There are many other points of view, and to see the present-day situation in true perspective some reference is necessary to the position in prewar days, to substitute raw materials, and to the operation of wartime controls.

The prewar position.

Britain's normal prewar consumption of paper was about 3½ million tons a year; this included paper of all kinds, about 38%

We are extremely pleased to present on these pages a most interesting and informative article about the paper situation in Britain, written for this, The Book Number of THE PAPER MAKER, by Henry Quentin Faichney, D.A.A. Mr. Faichney is Lecturer on Advertising Administration and Reproduction at the City of London College, and is closely in touch with paper production and usage in his country. We know our readers will be greatly interested in Mr. Faichney's graphic and thorough analysis, and it is our hope to publish future articles by him.
THE EDITOR.

being newsprint and only 13% other kinds of printing paper, including coated stock.

Two-thirds of this annual consumption was produced at home, for which purpose there was imported as raw materials in 1938:

1,600,000 tons of wood pulp, mainly from Sweden, Norway, and Finland.
340,000 tons of pulpwood, mainly from Newfoundland.
311,000 tons of esparto grass, from North Africa.

The balance was waste paper and rags, the bulk of which was obtained in this country.

The remaining one-third of our paper requirements was imported as paper; this included in 1938:

446,000 tons of newsprint from Canada and Newfoundland.
222,000 tons of wrappings.
340,000 tons of boards.

In addition to production for home consumption, about 175,000 tons of paper were manufactured in Britain and exported. There was also, in those prewar days, an export of 200,000 tons of waste paper.

Such was the broad statistical position of the British paper trade before the war. The North American continent enjoys large supplies of woods of many varieties, some peculiar to that continent and yielding special qualities of paper. As a consequence of this home supply of wood, paper became a substitute material in wartime deficiencies in metal and other substances. This is a situation directly opposite to that obtaining in Britain, a pulp *importing* country. Paper developments and usage must be studied with this in mind.

The coming of Control.

Immediately the war started, in September, 1939, a Paper Controller was appointed, his immediate task being to ensure adequate regular supplies of paper to meet the wartime needs of Government and Services; to organize production from dwindling stocks of raw materials despite continual withdrawals of labour fro papermills by the Man Power Board; an finally to procure paper to supply ordinar industry.

The *Control of Paper (No. 1) Orde* appeared on September 2nd, 1939, an maximum prices were laid down therein fo all kinds of paper and papermaking ra materials. The Paper Control became th sole buyer of imported materials.

There followed a long series of *Contr of Paper Orders* (over 74 have been issue to date) the purpose of these being to co serve shipping and currency by rationin all paper produced in Britain. Thus, i March, 1940, an *Order* limited the quanti of paper passing from mill to customer 60% of the prewar quantity, except und special license of the Ministry of Suppl

The producer of paper was rationed. N paper maker was permitted to deliver to h buyer more than a certain percentage of th total quantity of paper he had supplied that buyer during an equivalent period 1939. The quota was based on quantity *weight;* there was no obligation to supp the same kinds or amounts of paper as any previous period.

As the war went on, the series of restri tions increased in severity. The publishin of newspapers and periodicals not in e istence prior to August 16th, 1940, w barred; not more than 40% of newspap space could be devoted to advertisement poster-printing was curtailed and all no essential packaging; and drastic reductio were made in the permitted size of cheque letterheads, and stationery generally.

In the early months of the war the ta of the Paper Controller was relatively si ple, but when, in 1940, the Nazis overra the Continent, our supplies of paperma ing materials were mostly cut off. The flo of paper and boards from Scandinavi esparto grass from North Africa, stra boards from Holland, and rags fro

olland, Belgium, and France all ceased;
d the British paper trade was forced to
rn its attention mainly to home-produced
aterials, the chief of which were waste
per and straw.

At this stage the rationing of paper be-
me a more serious matter. The allocation
publishers of a quota had been intro-
ced after the Nazi invasion of Norway,
1940. For book publishers it was first
ed at 60% to be reduced in March, 1941,
50%; then in August, 1941, to 42%; and
ain in December, 1941, to 37½%. This
ota was based on the publisher's con-
mption during a "Reference Period"
mely, the year ended August 31st, 1939.
This Reference Period was adopted by
Government as the basis for many and
ied forms of rationing, apart from paper,
t for the book publisher it proved to be
unhappy selection—the year between
nich and the outbreak of war—because
nditions then were unsettled, the public
not buying freely, and many pru-
nt publishers had curtailed produc-
n of new books and restricted reprints
old ones.

blems of production;
bstitute raw materials.

Vith the near-European sources of supply
off and the realization that shipping and
rency had to be conserved, attention was
used upon home-produced materials.

f the total consumption of paper, there
believed to be 1½ million tons of clean
te discarded annually and, although
mally less than 5% of this was salvaged,
as thought possible (given the coopera-
of Local Authorities and the stimulus
rganized "salvage drives") to recover
ut 25% of clean waste. One ounce of
e paper per week from every home in
country would yield 16,000 tons a year.
appeals went forth with the result
n in the following table:

WASTE PAPER COLLECTIONS OVER THE PAST SIX YEARS (Tons)[1]

	From Merchants	From Local Authority	Total
1940	558,090	248,851	806,941
1941	459,343	299,840	759,183
1942	440,715	433,403	874,118
1943	380,409	319,944	700,353
1944	386,427	273,173	659,600
1945	367,943	215,000	582,943

The finest British printing papers used to be made from esparto grass, imported from Northern Africa and from Spain. Esparto grass has a unique place as a raw material for paper. So great was the belief of the British Admiralty in its value that within a fortnight of the capture of Algiers by the Allies a cargo of esparto was on its way to Guard Bridge, Scotland, where its use has been reserved for a Government specialty paper which is still on the secret list. The Scottish mills excelled in making papers from these fibres and before the war, considerable quantities were exported. Deprived of esparto, these mills turned their attention to straw.

Many users held the opinion that straw, though good enough for strawboards, was of little value in making reasonably good printing or writing papers; but, during the war, British mills have made papers from straw which are clean and which handle well. The harshness that we used to be nervous about from the printing standpoint has been overcome, to be replaced by a more kindly sympathetic sheet.

The only mills that could use straw were these mills which formerly used esparto, for they alone possessed the necessary plant. Even so, straw requires greater boiling capacity to remove the non-cellulose portion and disintegrate the fibres, and more fuel is needed to provide the steam pressure used. With a large acreage devoted to grain, Britain had plenty of straw; it was the lack of adequate plants for the preliminary treatment that restricted the supply necessary to fill the papermaking machines.

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[1] Quoted by Sir Stafford Cripps, addressing the Waste Paper Recovery Association, Feb. 14, 1946.

It was inevitable, therefore, that not only did the supply of paper decline in quantity but the standard of quality also dropped much below prewar levels. You cannot make such good paper from straw as from esparto; nor can you produce such a good sheet when you keep adding to your pulp, increasing proportions of waste paper in place of practically pure wood pulp, or pure wood pulp with a little mechanical pulp added.[2]

A special tribute is due to the paper makers for the way in which they surmounted the difficulties encountered when supplies of esparto and chemical wood pulp ceased. Of course, there was a good deal of poor—some very poor—paper made but this came from those mills which for one reason or another, aimed at quantity output in preference to quality.

Economies in paper usage.

The papermaker, then, did admirable work in adapting his production methods to the use of substitute materials; but the efforts of printer and publisher are no less deserving of praise as a brief consideration of their many self-imposed restrictions upon the use of paper will show.

Thinner papers were in demand for no one could afford to cut down on sheetage (i.e. number of copies) and, naturally, reduced bulk since the quota was based upon weight.

Further conservation of paper was achieved by closer word-spacing and the use of types of narrower set.[3] Such economy needed careful planning because, to be effective in book or pamphlet work, the saving by more compact setting had to amount to 8, 16, or 32 pages.

In the summer of 1941, the Publishers Association drew up a *Book Production*
War Economy Agreement which was volur
tarily adopted by most publishers. Comin
into force on January 1st, 1942, this pr
vided that every new book or reprin
thereof should conform to certain typ
graphical standards and to a maximur
paper substance specification. The numb
of words to the page, the size of type, and th
weight or substance of the paper and bin
ing boards, being thus controlled, there w
little possibility of wastage in the manufa
ture of books. But it should be noted th
the total amount of paper used by the boo
trade was but an infinitesimal fraction
the total amount manufactured; the pe
centage is estimated to lie between 1.4
and 1.5%.

During the war many printers enjoye
considerable prosperity as a direct cons
quence of united efforts by the book pu
lishers to impress upon the Governme
the national importance of books, both
a contribution to export trade and as a
item of great cultural value. Authors an
the book trade successfully resisted th
Chancellor of the Exchequer's attempt i
the summer of 1940 to make books subje
to purchase tax; a deputation to the cha
cellor was led by the Archbishop of Cante
bury and ultimately the proposal was wit
drawn. There has been no purchase tax o
books. They rank with food, light, hea
and the *very* few other basic necessities
life that are untaxed because they are esse
tial to the national well-being. The fact th
books have been free of that impost has le
them as almost the only coupon-free artic
in the gift category.

In book printing during the war, the
papers of lighter weight were made co
pulsory and featherweight papers were u
obtainable. Some publishers would pref
that books remain slim, and it will
interesting to see whether the uninform
public's demand for bulk is again to be m
by the use of featherweight papers whi

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[2] Excellent papers were made before the war from chemical wood pulp imported from Scandinavia and North America. These pulps (known to the trade as "wood free") are essentially different from ground or mechanical wood pulp used in making newsprint. The British wood-free mills, making printing papers largely from sulphite pulp, were *dependent upon imported pulp* since they have no facilities for treating raw pulpwood.

[3] Comparison of the set of the following founts will show the saving in space achieved by their use:

Baskerville 10-point	(10 set)	....................taken as basis
Bembo	(8½ set)	would save 15% in area
Fournier	(8¾ set)	would save 12½% in area
Centaur	(9¼ set)	would save 7½% in area
Goudy Modern	(9¼ set)	would save 7½% in area
Imprint	(9½ set)	would save 5% in area
Bodoni	(9½ set)	would save 5% in area

ve so much trouble to both printer and
nder alike.

artime losses through enemy action.

The paper situation, in so far as it
ected book production, was further aggra-
ted by the exceptionally severe losses
licted by "enemy action."

The British public, especially in London,
ll long remember vividly the big fire raids
ound St. Paul's Cathedral when, in Pater-
ster Row and adjoining streets—the long-
ablished centre of the book trade—more
an six million volumes were destroyed.
llions of others were lost in bookshops
d libraries in provincial cities and mil-
ns more in damaged, gutted or burned-
t warehouses, printing and bindery
rks. During the winter of 1940-41 well
er 20 million books, either bound or in
et, were "blitzed." Moreover the destruc-
n of many printing and bookbinding
nts left the book trade, not only with an
reased demand for its commodity and a
at deal of replacement, but also with a
ously reduced *capacity for production.*

The problems of book production have
n much more serious in this war than in
war of 1914-18. Supplies have been
re restricted. And as Philip Unwin has
nted out, though paper did not reach the
e of debasement to which it fell in 1918,
ry book designer in recent years had rea-
to give thanks to the Monotype Cor-
ation; many a book on thin and dirty
paper has managed to look reasonably
asant because of the beautiful types
ch have been available, despite the blitz.
monotype offices at 43 Fetter Lane,
t Street, survived the earlier onslaughts
after the night of May 10th, 1941, their
ding was a gaunt ruin. The bulk of the
lay matrix loan library was destroyed
many valuable type specimens, blocks,
photographs, though, happily, among
ortant papers retrieved from the strong
room was a copy of the rare *De Aetna* of Pietro Bembo which inspired the famous Bembo type.

But the book trade was no passive victim of disaster. Here is just one example of an acute emergency courageously met. In the Paternoster Row fire-blitz, the premises and stock (from 3 to 4 million books) of Simpkin Marshall's were totally destroyed. This leading wholesale house, on which large numbers of retailers depended for a proportion of their supplies, ceased to be in a single night. All records and unfilled orders were gone, too. Yet within a few days, a new Simpkin's was in existence and functioning, this time as a cooperative, nonprofit-making concern directed by the publishers and booksellers themselves. And so it was with many another firm that suffered irreparable loss in the bombardment of Britain from the air. Like the Phoenix, from the ashes they rise.

Cessation of hostilities;
Control goes into reverse.

In 1945 came the end of hostilities and with it the gradual—but *very* gradual—relaxation of control. The paper quota for book publishers was increased from 37½% of prewar usage to 50% (July, 1945), to 65% (November, 1945), to 75% (March, 1946)[4], and to 80% (for the period June 30 to November, 1946). In contrast to this, the increase for newspapers and periodicals has been from 22½% to only 28½%.

During 1945 also, the Ministry of Supply sanctioned small quotas to new publishers, particularly to ex-service men, and allowances were made to some publishers who had not previously had them, in respect of losses due to enemy action; in cases of special hardship, the paper quota of small publishers was raised to 100%.

Two relaxations were made in the War Economy Agreement governing the use of paper, the first increasing the permitted

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[4] A small reserve of paper had been set aside for the so-called "Moberly Pool"—a committee of four representative publishers under the chairmanship of Sir Walter Moberly—to help publishers to produce books of special educational importance and reprints of the classics for which they could not find paper from their normal quota. Up to February, 1946, 7,600 tons of paper had been allotted in the following proportions according to categories of books:

Medical	16%
General	14½%
Scientific & Technical	15%
Educational	26½%
Religious	13½%
Dictionaries	11½%
Legal	3%

weights of binding boards and the second easing restrictions on format and paper substance. This latter inevitably consumed more of the extra paper that had been granted in the ration, but both these steps were of importance if British books were to compete successfully in export markets. In this connection, an additional 10% over and above the ordinary quota was made available to all holders of book-publishing quotas under an export "target" scheme by agreement between the Publishers Association and the Board of Trade.

To users of newsprint in the periodical and magazine field, the year 1945 brought no relief except that a small new newspaper or periodical might be published provided it did not use more than 8 cwt. of paper in a ration period of four months and did not carry more than 20% of advertising matter. (Ordinary newspapers had been, and still are limited to 40% advertising space.)

The gratuitous distribution of advertising circulars, hitherto prohibited, was permitted up to 20% of the weight of circulars distributed in the prewar year, but restrictions on posters, showcards, etc. (except for export) were retained.

The postwar position.

As a direct consequence of this easing of the ration, more people are calling for paper and the papermaker is still facing a difficult situation in which there are many disquieting factors.

Speaking at a luncheon arranged by the Waste Paper Recovery Association, in February this year, Sir Stafford Cripps told how Britain was producing something like sixty per cent of the prewar figure for paper and board (1939 production was 2,650,000 tons) but with no imports of pulpwood or esparto, and imports of wood pulp unlikely to exceed one million tons, great reliance would have to be placed on home-produced materials.

For nearly six years straw has done du for esparto. Some fifty mills in Scotlan England, and Wales are consuming a proximately the same amount of straw esparto before the war but that does n give the same quantity or quality of pape To increase further the consumption straw—in view of the hoped-for big harves of 1946-47—would need fresh plants and f this labour and materials are not availabl

One large mechanical pulp mill and tw sulphite pulp mills have been making pul from home-grown timber. Rags also a available up to the boiling capacity of th mills. The gap in our supply of raw m terials has to be filled by waste paper. Th is particularly essential for board produ tion but owing to the sharp falling off collection, stocks fell to 3 to 4 weeks' co sumption and it was actually necessary import from Sweden some waste paper keep the board mills running.

> (Sweden, too, is not without its trouble Production there is being retarded by th shortage of fuel, the allotments of co being inadequate and substitutes li wood, peat, straw, and fuel oil are expe sive and not everywhere available.)

Nor must I omit to mention the gener difficulties with which papermaking, common with other British industries, faced today: worn-out machines, unskill labour, loss of variety in food, lack of i centive to earn more money, and a gener war weariness. These factors, coupled wi an extreme labour shortage in the book pr duction and binding trades, have result in books being printed and bound in A tralia and sent to England.

Meanwhile, the newspaper publishers a confronted with the converse problem: h to re-absorb employees returning from t Forces in the production of a four-pa paper which needs far fewer staff than t prewar editions of 24 or 32 pages. indeed, the prospect is *not* encouraging the user of newsprint.

Sir Walter Layton, Chairman of the Ra-
oning Committee of the Newsprint Supply
ompany, speaking at the Newspaper
ciety luncheon in May of this year when
ime Minister Attlee and Mrs. Attlee were
ests of honour, made these two points:

> There is a world shortage of newsprint,
> coupled with a world increase in demand.
> Britain must be under no illusion as to
> he amount of newsprint the country
> ould afford. We would do well if we
> ould reach 12-page newspapers by stages
> n the next three, four, or five years and
> return to prewar consumption was not
> et in sight.

or consolation that, for the newspaper
d advertising men who are kicking their
els in enforced idleness.

The original intention to increase the size
ewspapers on January 1st this year could
be carried out on account of our lack of
eign exchange. The actual world short-
of newsprint cannot quickly be reme-
d but an even more important factor is
over-all increase in world demand for
vsprint. India, China, France, and many
er countries are today sitting on Can-
's doorstep begging for newsprint, while
United States is making the pace with
reasing demands and falling domestic
duction. Canadian newsprint manufac-
ers are thus under the strongest pressure
n American publishers to sign up con-
ts for pulp or newsprint extending over
o, or even 15 years.

such famine conditions, Great Britain
articularly vulnerable since we produce
his country practically none of the ma-
als needed for papermaking. British
spapers are today using newsprint at the
of 300,000 tons a year, compared with
ly 1¼ million tons in the days of peace
re the war. As Sir William Layton
ted out: "We have cut down the
ht, trimmed the margins, abolished re-
s, and economized to the utmost; we can squeeze no more out of the present supply."

Additional supplies must be substantial since any increase in size must put the newspaper up from its present four pages to six pages, i.e., an increase of 50% involving a quantity of 150,000 tons of paper a year; to reach an 8-page newspaper calls for an additional 300,000 tons. From which must be drawn the unpalatable conclusion that a return to prewar consumption is not yet in sight; "we are under no illusion as to the amount of newsprint this country can afford."

Almost all the *paper* imported into Britain is for newspapers. The book trade is supplied from home sources. There may be a little wood pulp imported for book papers, but it is very little and it could probably be supplied all from old materials including salvage, if necessary. Of the total consumption of paper, the book trade has required only 1½%.

There is an insatiable demand for books of all kinds, especially educational; men and women returning from the forces are eager to equip themselves for their chosen vocations; librarians are seeking to restock their shelves, and tastes for reading and study are growing rapidly. Demand for books will keep ahead of supply for some time to come.

In normal times the annual production of books was in the neighbourhood of 100 million volumes. The number of new books (titles) published yearly from 1937 to 1941 was:[5]

1937	17,125 titles
1938	16,219
1939	14,904
1940	11,050
1941	7,581

Out of this total production of British publishers, over thirty per cent goes for export and the receipts from these sales are direct gains to the country's balance of trade. Books are exported (as volumes or sometimes as "sheets" to be bound by the buyer) to all parts of the world. The United States of America is the most important buyer of volumes in sheets and of "rights," while the British Dominions—Canada, Australia, New Zealand, and South Africa—are naturally great importers of British-made books. Thanks to the efforts of the British Council, our books are also finding their way to many other lands, not only English-speaking ones.

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[5] These figures are derived from Whitaker's Cumulative Book List as quoted in John Brophy's Britain Needs Books (National Book Council, London).

Publishers have undertaken to try to reach a target (viz: an export rate of more than double in value their prewar rate of export) by the middle of 1947 and an export research department has been created to help attain this target. A special increase of 10% over and above a publisher's basic paper ration (at present 80% of prewar usage) is made available to publishers who undertake to use it entirely for increasing their rate of export.

But whilst more paper is certainly needed by book publishers, the lack of paper is *not the chief* limiting factor today. The newspaper publishers are crying out for more newsprint but what the book publisher needs is more labour to overcome the appalling congestion of work in the printing and binding trades. Before the war, the average time for producing a new book was three months; today, six months is the minimum and the average is a good deal longer. Even when demobilization has been completed, it is expected that there will be 10,000 fewer trained workers in the industry than before the war, owing to casualti
and reduced intake of apprentices duri
the war years.

And even a return to normality in t
book-producing trade would not be su
cient. There must be *abnormal* producti
for four or five years if we are to repair t
losses of these war years.

All is not well with the book publishi
trade, despite the unheard-of prosperity
recent years; yet they have 80% of th
prewar paper.

The newspapers, on the other hand, st
languish on 28½% of their prewar supp
and the advertising agencies with th
clients in industry, are well-nigh mut
through continued lack of space in t
Press.

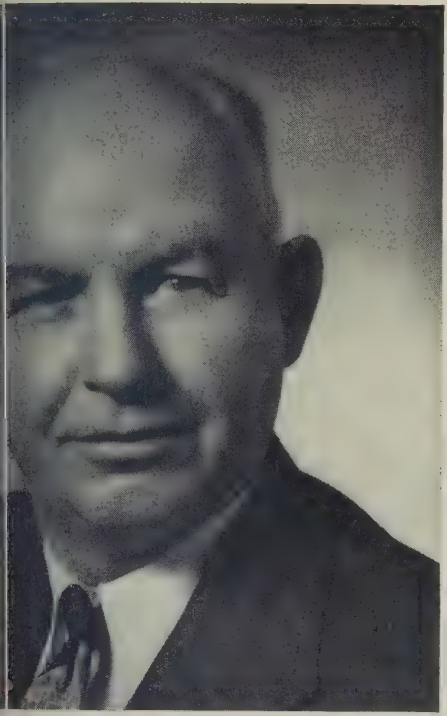
Nevertheless . . . . (and I cannot do b
ter than conclude this survey with the wor
of Geoffrey Faber, Past President of t
Publishers' Association) . . . . . "we
very hard to count our blessings and
include

the Minister of Supply,
the Paper Controller,
the President of the Board of Trade
the Department of Overseas Trade
the Minister of Labour,
the Minister of Health,
the Chancellor of the Exchequer,

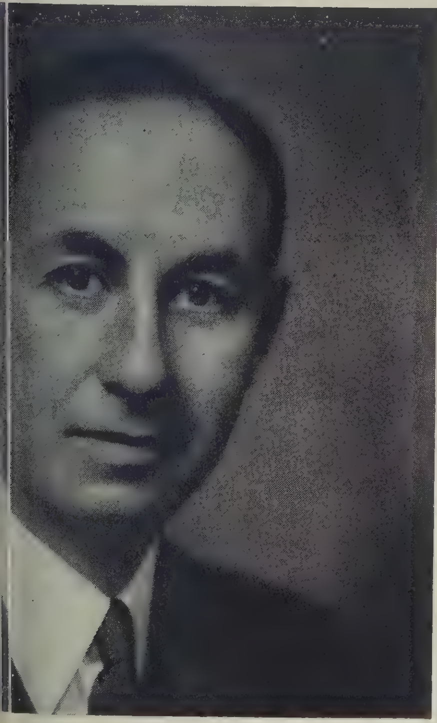
and a few other eminent administrat
among them. This is not very easy to
but it is a way of keeping the muscles of
mind in order, against the day when
shall not only be allowed, but obliged
use them seriously."

HONORS TO THESE MEN

A page of bouquets handed to men who have contributed to the development of the art and practice of papermaking past and present.



TO ROY HENRY KELLY—a native of Wisconsin, who began his papermaking career in that state nearly 50 years ago at the age of 13, and who, except for a period of eight years—four years with a well-known mill in Michigan and four years with various other mills, has remained within the Badger State—becoming a backtender in the Michigan mill when he was 20 years old, advancing to machine tender in the same mill three years later; especially for his nearly 35 years of association with one of Wisconsin's largest and best-known pulp and papermaking firms—a firm outstanding for its progressive mindedness and research accomplishments—where both his capacity for leadership and his knowledge of papermaking have been recognized and utilized—starting with that firm as a machine tender in 1912; being elevated to night superintendent in 1917, and then advanced to day superintendent in 1919, paper mill superintendent in 1920, general superintendent in 1943, general superintendent of pulp and paper manufacturing in 1944 (with a change in company name), and in 1946, to resident manager in charge of pulp and paper manufacturing; for his election both to the presidency of the Village Board of his home community and supervisor of his county in 1921, and for filling both of these elective positions through all of the intervening years to date—also serving as chairman of his County Board of Supervisors in 1933-1934; for his affiliation with and active interest in the affairs of the American Pulp and Paper Mill Superintendents Association—serving as its president in 1932; for his sociableness as evidenced by his membership in several fraternal organizations where the spark of good fellowship runs high; and, perhaps most of all, for his quiet friendliness that has been so helpful to so many.



TO RUFUS L. SISSON, JR.—for his family lineage, he being the third generation of a northern New York family continuously engaged in the lumber and paper industry of the state for over 80 years; for his graduation in 1914 from Dartmouth, one of New England's oldest and best-known institutions of higher education—being selected in 1912 as captain and member of the All-American Basketball Team when he led the Inter-Collegiate League in points scored; for his continuous association, since graduation from college, with the papermaking industry and specifically with the pulp and papermaking firm of which he is and has been for some years vice president and sales manager—a firm founded about 1890 by his paternal grandfather and operated by him or his descendants throughout the intervening years; for his capable direction of company activities, over a period of 15 years or more, in the development, production, and merchandising of an extensive line of specialty papers, with particular emphasis on embossed and printed papers; for his active participation in the affairs of the Sulphite Paper Manufacturers Association—serving as vice chairman for more than ten years, and as chairman for two years (1935-1936); for his continued interest in education, he being active in the alumni affairs of his alma mater—also in the problems of smaller, independently endowed institutions—having on two different occasions, once in 1922 and again in 1945, successfully directed campaigns to raise funds for a technical college in his home town; and especially for his deep interest in the upbuilding of young people (many young men having been inspired by his kindness, and assisted by his generosity, to go to college), he believing that the Free Enterprise System, which has made our nation great, depends in large measure upon the character and intelligence of American youth—truly a leader in the civic, educational, and spiritual life of his community and thus of the nation.

BOOKS HAVE SOULS

WHEN a volume is invested with vision and substance . . . it is transformed into a sanctuary of reflection.

A book composed with symmetry and quality . . . becomes a cathedral of wisdom . . . wherein all elements are obedient to its predominant purpose . . . gracefully shaped to its will.

Paper and binding . . . type and illustration . . . should blend with inspired harmonies that lend honor to The Rhythm of The Word.

Such a book defies Time . . . merges with Immortality.

P. K. Thomajan

EVOLUTION OF THE Book

WILLIAM BOND WHEELWRIGHT

HOW OFTEN we think of books as *volumes,* without remembering that a *volume* orginally described a *roll* of paper upon which a book had een inscribed! Or if not paper, the volume was made of papyrus, its predcessor, or frequently of animal skins joined together in one long strip.

It is hard to conceive of a more inconvenient structure for a book. magine what it would be like if your books were printed on window iades! You would have to roll and unroll to find your place in the ook, and there would be no possible way to index such a volume. In ich a form the New York telephone book unrolled could be wrapped ound Manhattan!

Considering that both papyrus and paper had then to be made in ther small sheets, it seems strange that the ancients should have pasted em into strips and wound them into rolls, rather than having conived so simple an expedient as folding and binding them into the more nvenient and manageable form known to the late classical world as *codex.* Nevertheless, for several centuries before the Christian era, d directly after it, books were made up in rolls.

"By the year A.D. 400," wrote Hellmut Lehmann-Haupt[1] curator of rare books at Columbia University, "the codex was in full command of the field, and since then the form of the book, roughly speaking, has not changed up to the present day." It is, however, an odd coincidence that books reproduced by the novel process of microfilm should, for obvious reasons, have reverted to the form of the roll. Although the form of the book was established at so early a date, its production remained dependent upon scribes for more than one thousand years. "Before the invention of printing, manuscripts were the only current books, and in general bore such excessive prices that few beside the most opulent could acquire a library.

"Some few data remain which serve to show us the esteem entertained by the most able connoisseurs of antiquity, from the large sums which they paid for the best books. Thus, it is recorded of Plato, that notwithstanding he had a very small paternal inheritance, he bought three books at the price of ten thousand denarii (about 1,500 dollars) . . . In after times St. Jerome almost ruined himself in order to purchase the works of Origen: during the dark or middle ages the prices of books became so high, that persons of moderate fortune could not afford to purchase them . . . none but kings, bishops, and abbots could be possessed of any books; which is the reason that there were then no schools but in kings' palaces, bishops' sees, or monasteries."[2]

By reminding ourselves of such facts we begin to appreciate the importance of the Chinese invention of paper, in 105 A.D., for this was the first substance which could be used economically for writing, or practically for printing, when that came into being. The absence of paper in Europe until after the twelfth century was enough to have precluded the invention of printing. In the Orient the first kind of printing came almost seven centuries before that of Europe, and strange as it may seem, not until 665 years after the birth of papermaking! In Japan, the Empress Shotoku had a million charms printed from

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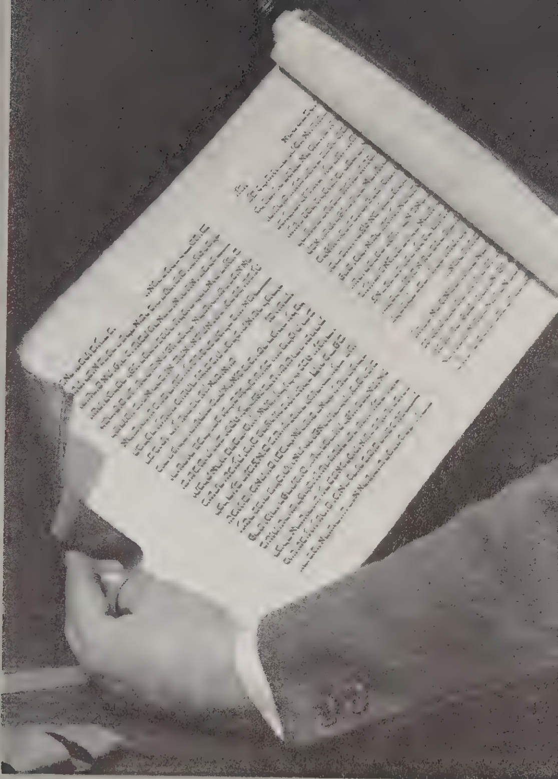
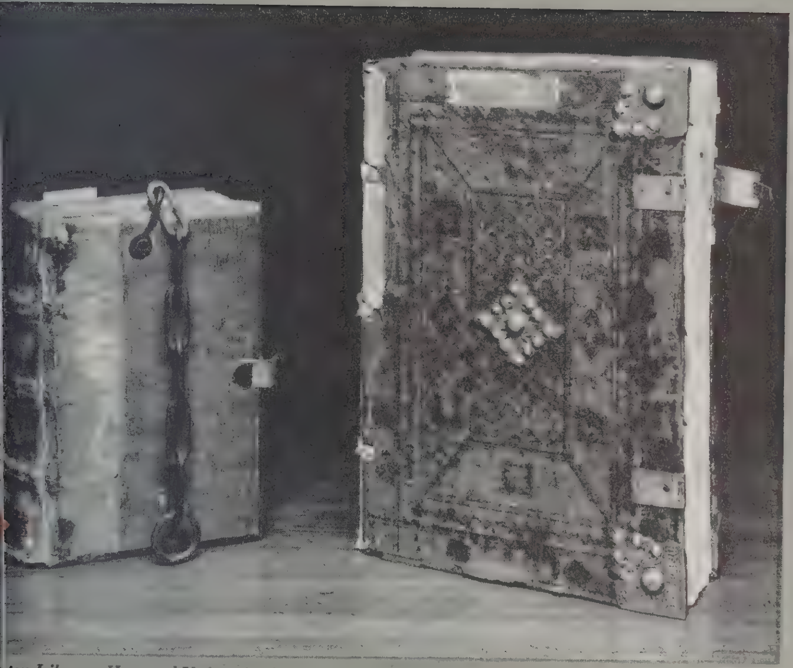
[1] Lehmann-Haupt, Hellmut, *A History of the Printed Book,* page 5, The Limited Editions Club, New York, 1938.

[2] Horne, Thomas Hartwell, *An Introduction to the Study of Bibliography,* Vol. 1, page 345, T. Cadell and W. Davies, London, 1814.

On this volumen appears The Book of Esther, in Hebrew; the parchment roll is eleven feet long and eleven inches wide.



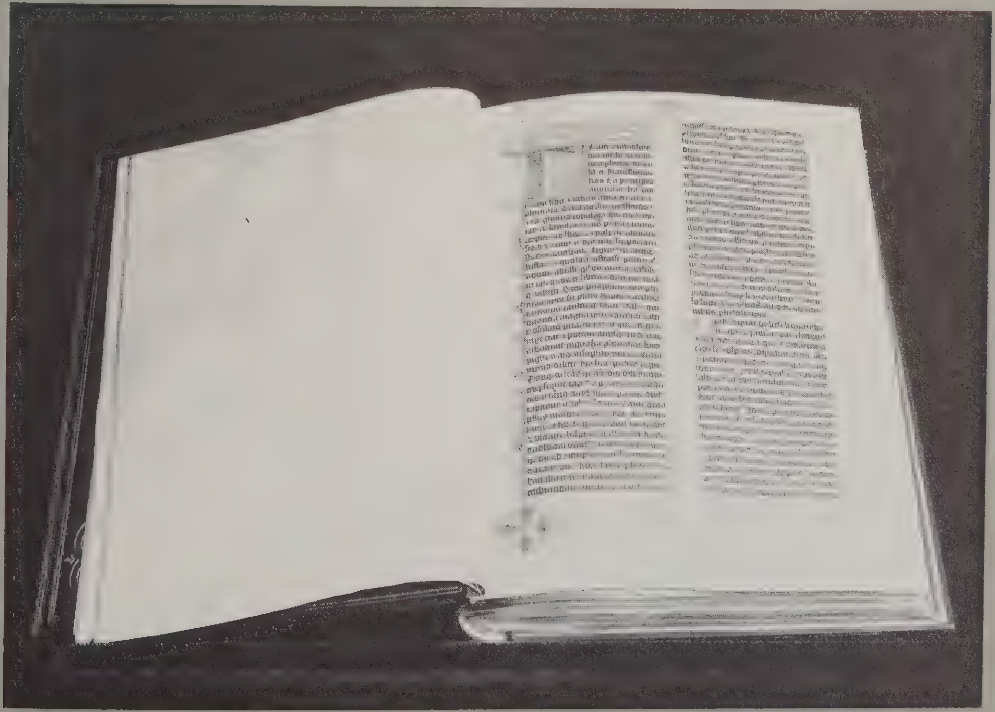
Houghton Library, Harvard Univers



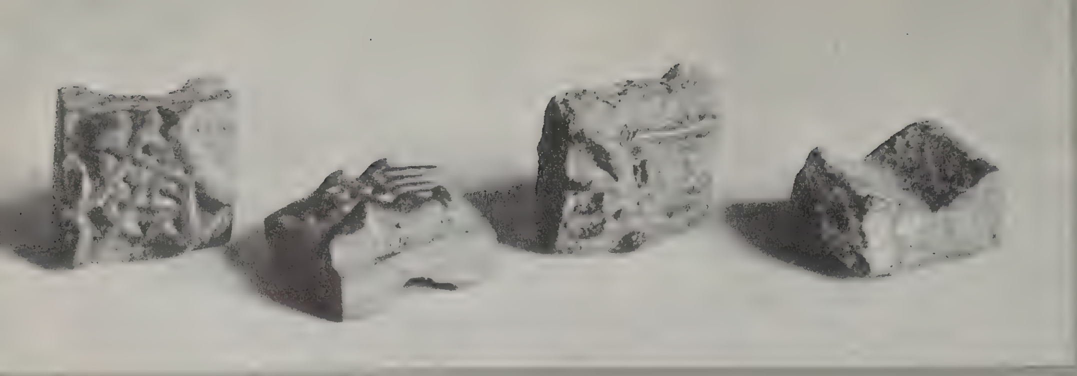
ton Library, Harvard University

This chained monastic manuscript, four and one-half by six and one-half inches in area, was scribed about 1390. The stout covers of oak, with pigskin back, have withstood the wear of centuries.

ery page of this Gutenberg
ble, bound in two volumes,
perfect. It was among the
t copies made, and has but
ty lines in each column.
hen it appeared that the
per available would be in-
icient, the printer set the
umns in forty-two lines.

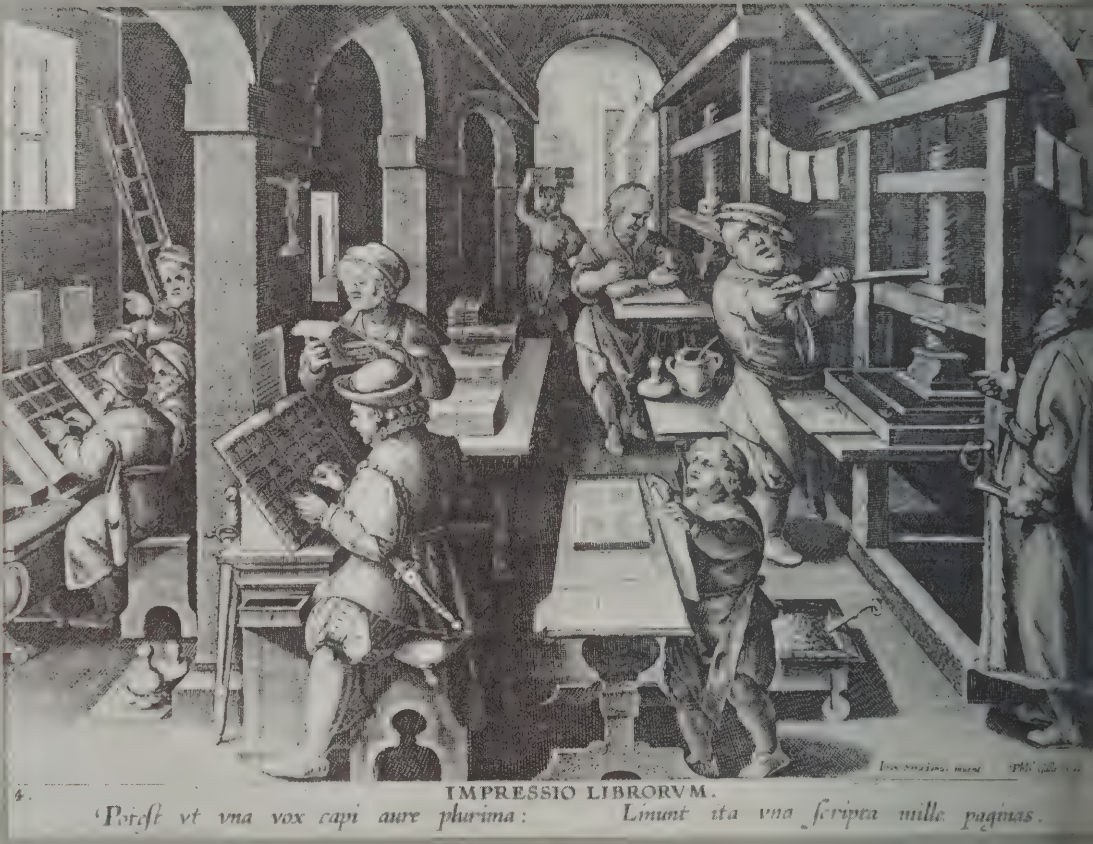


Widener Library, Harvard University



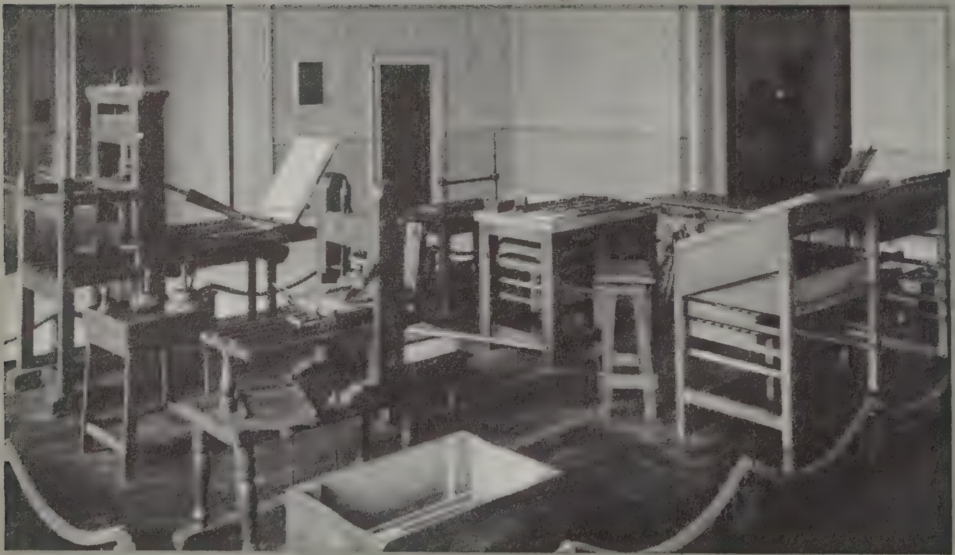
These specimens of Korean metal type are ancestors of our metal type of today. Rectangular and flat, they could not be locked up in a chase.

Houghton Library, Harvard University


4.
IMPRESSIO LIBRORVM.
Poteſt vt vna vox capi aure plurima: Linunt ita vna ſcripta mille paginas.

From this fifteenth century printing office it is a far cry to those which house our craftsmen of today. Crude though those shops were, books there produced and still extant bear tribute to their makers.

Houghton Library, Harvard University



In Ben Franklin's time, this was a modern printing shop. In a setting such as this Ben Franklin produced books of merit, and there laid the foundation for his long and successful life as inventor, statesman, philosopher, and printer.

Franklin Institute

ılocks in 770 A.D., which was the first printing on paper. In China in 68, the earliest printed book appeared—the *Diamond Sutra;* "the roll, he original form of true Chinese book, is sixteen feet long."[3] The rinting was accomplished by placing a sheet of paper upon the inked ood blocks, and rubbing the upper side of the sheet with a fiber or loth ball, until the pattern was offset on the paper.

It will be realized that such printing techniques bear no resemblance those invented much later in Europe. The point is that the existence f a really suitable medium for printing led to some form of printing, due course, in both continents, independently of one another. As [. G. Wells, so rightly observed, "It was the introduction of paper from ie East, that made practical the long latent method of printing . . . it is arcely too much to say that paper made the revival of Europe ossible."[4]

The date of the earliest block printing in Europe is not definitely iown. Textiles were stamped there in the twelfth century, when ipermaking was just beginning in Spain. Some believe block printing is first used to make playing cards, but so far as the manufacture of oks is concerned there is no evidence that it antedates the first typo-aphic printing. After the establishing of typographic printing, wood gravings were soon employed to embellish or to illustrate the book.

When the invention of printing is mentioned, most of us think of hn Gutenberg, of Strasbourg and Mainz, who developed the art by eans of movable types shortly before the middle of the fifteenth ntury, and produced the celebrated forty-two line Bible about the ır 1456.

Although this invention, as we have seen, was far from having been first printing in the world, it was the first kind of printing which de the production of books practical and, ultimately, inexpensive. s not even Gutenberg's invention of movable types which differen-es occidental from oriental printing, for the Chinese had movable characters in the eleventh century and the Koreans cast metal characters before his time. But their types bore no resemblance to those of Gutenberg. Their bodies were rectangular and flat, and could not be aligned and locked up in a chase like the type of Gutenberg. "The metal casting mould, the application of the press, and the use of oil varnish ink by Gutenberg, together constitute the basis of European printing."[5]

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[3] Hunter, Dard, *Papermaking*, pages 35, 39, Alfred A Knopf, New York, 1938.

[4] Wells, H. G., *The Outline of History*, page 750. Garden City Publishing Co., New York, 1920.

Up to the time of this invention, paper had been used mainly for writing purposes. In the Orient this was done with a brush and fluid pigment on soft, unsized paper, and in Europe with pen and ink on hard, animal-sized paper. In ancient days the early printing had to be adapted to the paper, whereas in our time paper is made to be adaptable to the diverse kinds of printing which have been developed.

Printing is not only indebted to papermaking for its origin, since without paper it could not well exist, but the earliest printing presses closely followed the type of those in use by ancient papermakers, with the addition of accessory features.

It taxes the imagination to conceive of the primitive state of the allied industries, papermaking and printing, in Gutenberg's day. The typical crew of three papermakers could make by hand only about five reams of paper a day, while the clumsy screw printing press might deliver 500 impressions in a day of twelve hours.[6]

The sheets upon which the forty-two line Bible were printed measured about 16½ × 23½ inches. Each copy took 320 sheets, and it is believed about 200 copies were produced. A number of them were printed on vellum. On the authority of the Harvard College Library's Department of Printing and Graphic Arts, it may be stated that "there are 45 known copies of the Gutenberg Bible, and of these only 18 are complete. Twelve of these 45 are on vellum, and of these twelve only four are complete."

I have had the exciting experience of seeing copies in the Congressional Library, Washington, the Morgan Library, New York, and the

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[5] Fuhrmann, Otto W., *A History of the Printed Book,* page 30, The Limited Editions Club, New York, 1938.

[6] Pottinger, David, *Printers and Printing,* page 58, Harvard University Press, 1941.

Widener Library, Harvard University. All of these monumental volumes are so wonderfully well preserved as to suggest that this first example of Occidental book manufacture is endowed with immortality! This is a great credit to the paper employed. Nevertheless, the production of a part of the edition upon vellum suggests that not too much reliance was placed on the longevity and endurance of paper.

It may be said without fear of contradiction that paper of a more permanent quality would be hard to make. For this was composed of linen and cotton rags, prepared without artificial bleaching. The prevailing method of beating by stamping machines left the fibers longer and stronger than do our modern beaters: the sheets were dried naturally, by air; afterwards they were dipped in an animal size, which, after drying, left a hard, impervious surface, suitable especially for writing but offering difficulties to press-work which the printers had to ind means to offset.

This process is described in a book published in 1814, when hand-made papers still predominated, as follows:[7]

> "The paper is prepared for use by being previously dipped in water, a few heets at a time, and afterwards laid in a heap, sheet over sheet; a thick deal board s laid upon the heap, on which heavy weights are placed according to its size. The reason why paper must be wetted before it is in a fit state to be printed upon, s that it may become sufficiently soft to adhere closely to the letter, and take p a proper quantity of ink, that it may receive a fair and clear impression. It is lso necessary to wet the paper lest its stiff and harsh nature, when dry, should njure the face of the letters."

We do not know that Gutenberg had discovered and followed this rocedure, but we do know that it became, sooner or later, an accepted practice. We also know that some time later, the printers learned that heir work at the press could be lightened by the use of unsized paper, hich was softer. No doubt the lower cost of the unsized sheets, which required considerably less handling to make, was another strong inducement to its selection.

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[7] Horne, T. H., Introduction to the Study of Bibliography, Vol. 1, John Murray, London, 1814.

There are so few who have actually operated a hand printing press that a brief description is in order. The earliest presses, copied after those in use by papermakers, exerted their force by means of the screw and bar. The later, improved models adopted a lever principle which made for higher speed. In either case the power was man's muscle pulling on the bar which actuated the mechanism. The experienced pressman could judge by the feeling in his arms when he had exerted sufficient force to ensure a good impression from the inked form upon the paper. Hence, any variations in the thickness of the sheets had no effect such as results on modern precision machines. Even the inking of the forms was accomplished with leather balls by hand, and in order to secure a fine, black impression the press was usually pulled twice. The accent was not so much on instrumentation as upon craftsmanship.

From the viewpoint of the modern papermaker, held to strict tolerances of weight, bulk, and finish of paper, the contrast is interesting There was no such thing as a "kiss impression" for the hand-press. When the press was pulled there was a thick blanket between type face and platen to protect the type from breakage, and the impression was forced into the moistened sheets of paper.

Improvements were gradually made in the ancient wooden presses so that the work went faster. "According to the Printer's Regulation of Frankfurt in 1573, the daily production amounted to an average of 3,600 prints . . . The working time totalled then fifteen hours per day including meal time, making an hourly production of 240 prints."[8]

Compared with the estimated speed of presswork in Gutenberg's time, of 500 impressions in a twelve-hour working day, or about 24 prints per hour, this speed-up seems quite noteworthy. It indicates a considerable improvement in the mechanism of the presses over the cumbersome screw press of the fifteenth century. For as long as printing and papermaking continued to be hand processes, which was well into the first quarter of the 19th century, the changes in production techniques were inconsiderable.

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[8] *From Gutenberg to The Cuneo Press* (pamphlet), The Cuneo Press, Chicago, 1933.

In the evolution of the book from the *volumen,* which was mounted on a wooden spindle, protected on its ends with projecting bosses, there came a transition stage which produced the codex form of book. This gave rise to a rudimentary form of binding. "At first," according to McCarthy, "the sheets making up a work were probably simply tied round with a cord, or kept in boxes. Then to prevent disarrangement of the order of pages, came the idea of sewing through them and securing them by a knot. Next this side-stitched method was improved upon by sewing through the folds of the sheets to horizontal bands or cords, and the ends of the cords were probably brought around the book and tied. For increased protection the next step of adding thin, rectangular boards at front and back was introduced, and finally the back for the book was devised as an integral part of the binding."

From such crude beginnings the art of the bookbinder kept pace with hat of the scribe, the illuminator, and the wood engraver. By the time printing was invented, the craft of book binding "was already at an dvanced stage, and since that time almost no new principle has been ntroduced to improve the ideal binding of a book."[9]

Thus it may be said that, with the invention of printing from movable ypes, the application of the press and the use of oil varnish ink the volution of the book was attained upon the completion of Gutenberg's orty-two line Bible.

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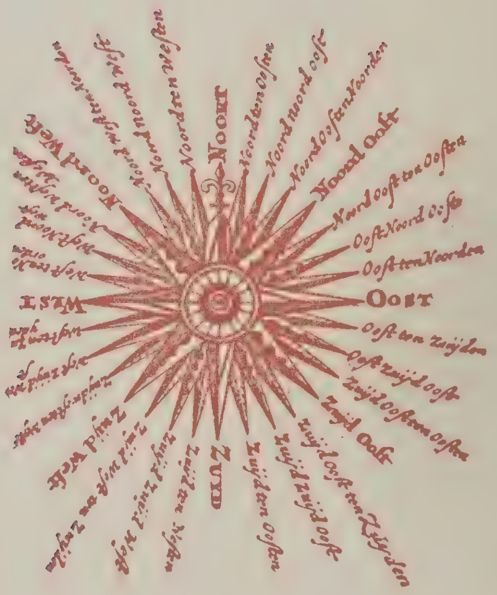
[9] McCarthy, Jr., William H., *A History of the Printed Book,* pages 447-461, The Limited Editions Club, New York, 1938.

Noort
Noord ten Oosten
Noord noord oost
Noord Oosten Noorden
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Noord Oost ten Oosten
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Oost Zuijd oost
Zuijd Oosten Oosten
Zuijd Oost
Zuijd Oost ten Zuijden
Zuijd Zuijd oost
Zuijd ten Oosten
Zuyd
Zuijd ten Westen
Zuijd West
West
Noord West
Noord ten Westen

WE INDULGE IN PAPER

1. Our pulp and paper industry ranks sixth in size among American industries.

2. Our wood-pulp production has quadrupled in the past decade. More paper is now used for wrapping and packaging than was for all purposes in 1935.

3. The United States makes over 50% of the world's paper and uses over 60%. Most of our paper imports come from Canada.

4. In a typical year, America consumes some 20 million tons of paper and paperboard—more than 300 lbs. per capita.

5. About 95% of all paper is made from wood: chiefly spruce, hemlock, southern pine, balsam, firs, cottonwood, and aspen.

6. Since 1867, when the first pulp mill was established, American forests have provided 235,000,000 cords of pulpwood.

7. There are more than 200,000,000 acres of forest land in the South; or nearly half of the nation's commercial forests. The bulk of our domestic pulpwood, however, is cut in the North.

Courtesy of *Science Illustrated*

Books

A BRIEF CHRONOLOGY

by Harry E. Weston

Without books God is silent, justice dormant, natural science at a stand, philosophy lame, letters dumb, and all things involved in Cimmerian darkness.—THOMAS BARTHOLIN, 1672.

8 The first printed book, so far as is
own, is the *Diamond Sutra.* This book,
nted on May 11, 868, was discovered by Sir
rel Stein in 1907 while exploring the
ves of the Thousand Buddhas near the
of Tun-huang in northwestern China.
nted by Wang Chiek, the book was con-
ved as a means of perpetuating the memory
his parents.

* * *

6 One of the first books, probably not
first, to come from the press of Johann
enberg, the commonly credited inventor
novable type, was the Bible. This Bible,
ted in Latin, made its appearance some-
e between 1450 and 1456. A rubricator's
in one of the copies, recording the com-
ion of his work, is dated August 14, 1456,
proving the book must have been printed
ious to that date.

his first printed edition of the Bible is
wn variously as the *Gutenberg Bible,* the
ne Bible (42 lines to the column on most
he pages), the *Vulgate,* or the *Mazarin Bible.* Printed two columns to the page with spaces for initial and border illumination, the book, usually bound in two volumes, measures about eleven inches across by sixteen inches high.

Some copies of the book were printed on vellum; some on paper. The paper used for the printing is unusual for its permanency, color, and texture. It bears the watermark of a bunch of grapes.

(At the time of the printing of the Gutenberg Bible, the Bible text, in whole or in part and in manuscript form, had been translated into only 33 languages — 22 European, 7 Asian, 4 African. In 1938, the Bible, in whole or in part, had been published in 1018 languages and dialects.)

* * *

1457 The first printed book to contain the name of printer and date of publication is the *Psalter* of 1457. It also contains the earliest known printer's mark (not used in all of the copies).

The book was printed by Johann Fust, a

citizen of Mainz, and Peter Schoeffer of Gernsheim. Schoeffer, considered the greatest printer of his time, was also a copyist and had been one of Gutenberg's workmen. The date of printing, as previously cited, was 1457. The printer's mark is that of two shields hanging from a branch.

Two editions of the *Psalter* were printed — the first with 143 leaves; the second containing some added material with 175 leaves.

* * *

1460 The *Catholicon,* a Latin dictionary, printed in 1460, at Mainz, is the first book to carry the name of the place of printing. Although the name of its printer is not given, the printing is commonly ascribed to Gutenberg. Written by Joannes Balbus in the thirteenth century, the volume, printed two columns to a page, appeared as a book of 373 leaves.

1461 Albert Pfister of Bamberg printed a series of German fables by Ulrich Boner, under the title *Der Edelstein,* in 1461. This book, printed in German, is the earliest dated book printed from movable type in any language other than Latin. It also is one of the first books to be illustrated with wood cuts, Pfister being credited with their introduction, and in this instance using 101 of them.

1463 The first book to have a separate title page appeared in 1463. Printed in Mainz, the book is referred to as the *Bul zu dutsch* (Papal letter in German) of Pope Pius II.

* * *

1467 Printed at Strasbourg in 1467, *Opus de universo* is the first book to contain a chapter on medicine. The book, written by Rabanus Maurus, was printed by Adolf Rusch. (More than 200 books, wholly or partly of
medical interest, appeared from 1467 throu
1480.)

1469 The first advertisement of books
sale was issued by Peter Schoeffer in 14
Printed on one side of a sheet, this adverti
ment listed twenty-one books. Among
titles were the *Psalter* of 1459, and the 14
Bible on vellum.

1470 The first illustrated German Bible
printed about 1470. Jodoc Planzmann
the printer. He used a small outline
at the head of each book.

1470-71 Arnold Ther Hoernen of Colog
in 1470-71, introduced the use of headli
and the numbering of pages. *Sermo ad p*
ulum, printed in 1470, has its pages numbe
in the center of the right-hand margin. (Sc
authorities also credit the introduction of
title page to Hoernen.)

* * *

1474-76 The first book to be printed
English was the *Recuyell of the Historye*
Troye. It was printed at Bruges somet
between 1474 and 1476 by William Ca
and Colard Mansion from a translation m
by Caxton.

1476-77 William Caxton, born about
"in the weald of Kent," returned to Engl
from Burgundy in 1476 and set up the
press in England in a shop near Westmir
Abbey. He continued in business in W
minster until his death in 1491. Then
business was taken over and continued by
foreman, Wynkyn de Worde (See 1495).

1481 The first illustrated book to be pri
in English is entitled the *Myrrour of*

Vorlde. It was printed by Caxton in 1481. The paper used for this book, like that of all ther books printed by Caxton, was of forign manufacture.

482 Euclid's *Elements of Geometry* apeared in print for the first time in May, 482. Erhard Ratdolt of Venice was its rinter. He, therefore, commonly is consided as the first printer to produce geometric agrams successfully in a printed book.

A Latin translation of the twelfth century, id to have been made by Adelard of Bath, English philosopher, was used for the text.

(In 1481 or 1482, Petrus of Corneno of ilan printed similar diagrams in *Perspectiua mmunis*, a book by Archbishop Peckham.)

* * *

491 The first arithmetic book came from a ss in Florence, Italy. The book appeared 1491. Authored by Phillipo Calandro, it s entitled *Pictagoras Arithmetice Introduc-*

95 The first book to be printed on paper de in an English mill was *De Proprietatibus um*. This Latin volume by Bartholomaeus glicus was printed in 1495 or thereabouts. ne sources give the date as 1498.) The nter was Wynken de Worde of Westister.

he paper used for the book bears the ermark of an eight-pointed star within a oble circle or wheel. It was made in the i of John Tate — the first paper mill in nland. Located in Hertford, this mill an operation in 1495.

1 Aldus Manutius, a Venetian scholar printer, is credited with popularizing the d book. In 1501, he printed *Virgil* in a l 12mo. size. This printing was made sble by his use of a new and more compact form of type face which has since become known as *italic*.

Manutius, considered as the first of the great scholar-printers, set up his printing establishment in 1491. He died on February 6, 1515 while in his sixty-eighth year.

* * *

1529 Geofroi Tory, scholar, type designer, wood engraver, and printer, published his famous *Champfleury in 1529*. It was in this book that Tory's Broken Jar printer's mark (*Pot Cassé*) appeared for the first time. The book was printed in Paris.

1534 Printing was introduced to the New World in 1543 from Spain by Juan de Zumarraga, the first Roman Catholic bishop of Mexico. Not only did the bishop bring printing equipment from Spain to Mexico, but he also brought a printer. The name of this first printer in the New World was Esteban Martin.

* * *

1568 A book of trades, published in 1568 in Frankfort-on-Main, contains the first illustration of a papermaker as well as the first poem about papermaking to be printed in any book. The illustration is from a wood engraving by Jost Amman; the poem is by Hans Sachs, the cobbler-poet of Nurnberg.

The woodcut shows a vatman forming a sheet of paper, a small boy carrying some finished sheets, a press, and a stamping mill.

The book covers one hundred and fifteen trades or callingo. Each trade is handled in the same way as that of the papermaker — a woodcut illustration by Jost Amman, and a poem by Hans Sachs.

The title of the book is *Eygentliche Beschreibung Aller Stände auff Erden, hoher und nidriger, geistlicher und weltlicher, aller Künsten, Handwercken und Händeln.*

1639-40 William Peirce's *Almanack* for 1639 is the first book to have been printed in what is now the United States. It was printed by Stephen Daye on a press purchased in England by Reverend Jose Glover and set up in Cambridge, Massachusetts, during the autumn of 1638, under the direction of Mrs. Glover. The Reverend Glover, in the time between the purchase of the press and its installation, had died.

No copies of the Peirce *Almanack* are known to exist. The earliest existing known book of this Cambridge press, the first press in British North America, is the *Bay Psalm Book.* Appearing in 1640, this book is titled *THE WHOLE BOOKE OF PSALMES FAITHFULLY TRANSLATED into ENGLISH METRE.*

(The Cambridge Press went out of existence in 1692. It had operated for more than 50 years under Stephen Daye, his son Matthew, Samuel Green, Samuel Green and Marmaduke Johnson, and Samuel Green and his son Bartholomew.)

* * *

1661-63 John Eliot's *Indian Bible,* printed by Samuel Green and Marmaduke Johnson, was the first edition of the Scriptures to be printed in the New World. The New Testament was printed in 1661. Then copies of it were bound with the Old Testament and the complete Bible published in 1663. The complete Bible contains two title pages—one in English, the other in Indian.

1683 The first, as well as the most complete, of the early type manuals is Joseph Maxson's *Mechanick Exercises.* Published in London in 1683, this book, for nearly 100 years, served as an authoritative treatise on type founding and on printing production.

1696 The first mention of papermaking in English writings appears in a book of machinery that was published in London in 16
The book, written by Venturi Mandey, is
titled *Mechanick Powers; or, The Mystery*
Nature in removing and raising Bodies
vast Weights: with little Strength or For
also the making of Machines or Engines,
the raising of water, draining of Grounds,
several other Uses.

* * *

1782 The first American edition of the Bi
to be printed in English was produced
1782 by Robert Aitken of Philadelphia.
location, as given by the title page, was Po
Head, three doors above the Coffee House,
Market Street.

The page size of the Bible was 3½ inc
by 6 inches.

The pages were not numbered. The
ume totaled more than 1400 of them.

1821 Matthew Carey and Son, Philadelp
in 1821, published a book by N. Lavoi
entitled *A Complete Genealogical, Histori*
Chronological, and Geographical Atlas.
book is stated to be the first important b
to be printed on American machine-m
paper. The paper used for the book
manufactured on a cylinder machine in
Gilpin Mill, located on the Brandywine,
Wilmington, Delaware. This paper mach
the first to be installed in the United Sta
went into operation in August, 1817.

1897 The main building of the Librar
Congress, Washington, D. C., was compl
in 1897. (Much enlarged, the present Lib
in 1945 contained seven million volumes,
15 million other pieces in the form of m
scripts, unbound serials, music, maps, pr
film strips, etc.)

1903 Frederic W. Goudy founded the
lage Press in July, 1903. He located it in

arn at Park Ridge, Illinois. The press as moved in March, 1904, to Hingham, Iassachusetts. Two years later, it was moved the Parker Building, New York City, where was destroyed in 1908 by the burning of e building. Re-established soon afterward Marlborough-on-Hudson, New York, the ess continued to function until 1939 when is workshop, too, was destroyed by fire.

Mr. Goudy designed Camelot, his first type ce, in 1898. By March, 1945, when he was ghty years old, he had completed his 121st pe face.

920 An outstanding contribution to the chnical literature of pulp and papermaking is printed in 1920. It was Sutermeister's *emistry of Pulp and Paper Making.* The bject matter of the volume had been col- ted from personal notes and experiences of author (Edwin Sutermeister), accumu- ated over a period of twenty years of associ- on with the industry as well as from a eview of the literature. (So popular was book, that a second edition was published 929 and a third edition in 1941. The work he first two editions was done entirely by Sutermeister, while the third edition is a aboration with thirteen additional con- iuting authors.)

* * *

23 *Old Papermaking,* a book from the iate press of Dard Hunter, Mountain ose, Chillicothe, Ohio, was printed in 1923. only did Mr. Hunter print this book, he wrote the text; made the paper by hand which the book was printed; designed, and set the type for the book; and bound printed volume. The edition, because e manner of its production, was limited ss than 200 copies.

thor of many magazine articles, as well umber of other books relating to paper- ing, Mr. Hunter is now Curator of the Hunter Paper Museum, Massachusetts Institute of Technology, Cambridge, Massachusetts. This museum dates back to December, 1938, when Dard Hunter and his son, Dard Hunter, Jr., began to place the several thousand exhibit items in the space set aside for them at the Institute.

The titles of some of the other books written by Mr. Hunter, in each case followed with the year of printing, are: *Papermaking Through Eighteen Centuries* (1930); *Papermaking in the Classroom* (1931); *Chinese Ceremonial Paper* (1937); *Papermaking by Hand in India* (1939); and *Papermaking - The History and Technique of an Ancient Craft* (1943).

* * *

1938 A book, prepared by the Westinghouse Electric & Manufacturing Company as part of a contribution to the people of a future age (hopefully 6939 A. D.) was printed in limited edition in 1938. The book, entitled *The Book of Record of the Time Capsule of Cupaloy* was designed and arranged by Frederic W. Goudy; and was printed on a special supply of 100 per cent rag paper made by the Hurlbut Paper Company.

One very interesting section in the book, written by Dr. John P. Harrington, Ethnologist, Bureau of Ethnology, Smithsonian Institution, Washington, D. C., presents "A Key To The English Language."

Copies of the book were placed in libraries, museums, and other repositories; but, in addition, one copy was placed in a specially designed time-resisting capsule along with a copy of the Holy Bible and other material and information touching upon the principal categories of human thought, activity, and accomplishment of the present day.

On the outside of the capsule is a die-stamped message. In part, it reads, "If anyone should come upon this capsule before the year A. D. 6939, let him not wantonly disturb it, for to do so would be to deprive the people of that era of the legacy here left them. Cherish it therefore in a safe place."

On September 23, 1938, the loaded capsule was buried fifty feet beneath the surface of the earth on the grounds of the New York World's Fair. There with its cherished load, it rests for the people of a far-distant future age.

* * *

1942 A new high price of $15,600 was registered in 1942 for John James Audubon's *Birds of America* (1827-38).

1943 The number of copies of all books sold by all book publishers in the United States during 1943 totaled 551,290,000. The estimated value of these books was placed at $30 379,000.

1945 Bruce Rogers, outstanding book signer, received an assignment from The Wo Publishing Company on December 4, 1945 design a lectern Bible more beautiful ty graphically than any Bible published pre ously in the United States. The Bible is be printed in limited edition of 1,200 to 2, copies. A special cutting of 18-point Go New Style type face will be used for the pri ing; and printing will be upon one hund per cent rag paper. Publication of the Bi is expected sometime in 1948. Its selling p is expected to be about $150 a copy.

Miscellaneous Notes

Philliatius, an Athenian of the first century, is credited with introducing the use of glue for binding sheets of papyrus manuscripts together to form books. Such books were produced in roll form rather than sheets.

Artisans of ancient Rome who glued sheets of manuscript together to form scrolls were known as glutinators.

Manuscripts of the early centuries were often beautifully illuminated. This art was continued into the early printed books. It was often used for initials. *Summa of Aquinas,* printed about 1465 or 1466, by Mentelin, is an example of this class of pen illumination.

Bindings of some of the early manuscripts were very lavish. One binding, done in the year 518 A. D. for Emperor Justinian I, weighed fifteen pounds. It was a gold binding with an inset of jewels.

One of the early bookbinding materials was wood; and it continued to be used for the purpose until about the end of the fifteenth century.

Beech was often the wood used for these early covers; and it is from the German word "Buch," meaning beech, that the word book is derived.

These wood covers gave way to pasteboard soon after the introduction of printing. Such board was often made from printing waste; and from some of these covers considerable valuable printed matter of the e days of printing has been discovered.

Block books is the term given to books printed f engraved blocks of wood. Such books were prod quite plentifully during the latter half of the fifte century and the first half of the sixteenth centur Germany, Holland, and England. Some such books were produced in France during the same period.

The Chinese produced block books at a much ea date, and no doubt the European countries borr the idea from them.

Engravings for these early European books were on the flat or plank side of a board rather than o end grain. Sometimes the text was separately cu other instances, illustrations and text were cut toge

Block books were printed one or two pages at a on one side of the paper only. The paper used for books was of excellent quality.

Incunabula, or cradle books, is the term give books printed before the end of the year 1500.

In the sixteenth and seventeenth centuries, Euro churches commonly fastened books to their shelves chains to safeguard them against thieves.

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PAPM
1947'

The Paper Maker

Number One, 1947

THE PAPER MAKER

NUMBER I · 1947

BRONSON B. TUFTS, Editor
EDWARD L. GRANT, Art Editor

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HERCULES POWDER COMPANY
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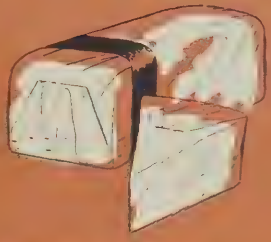

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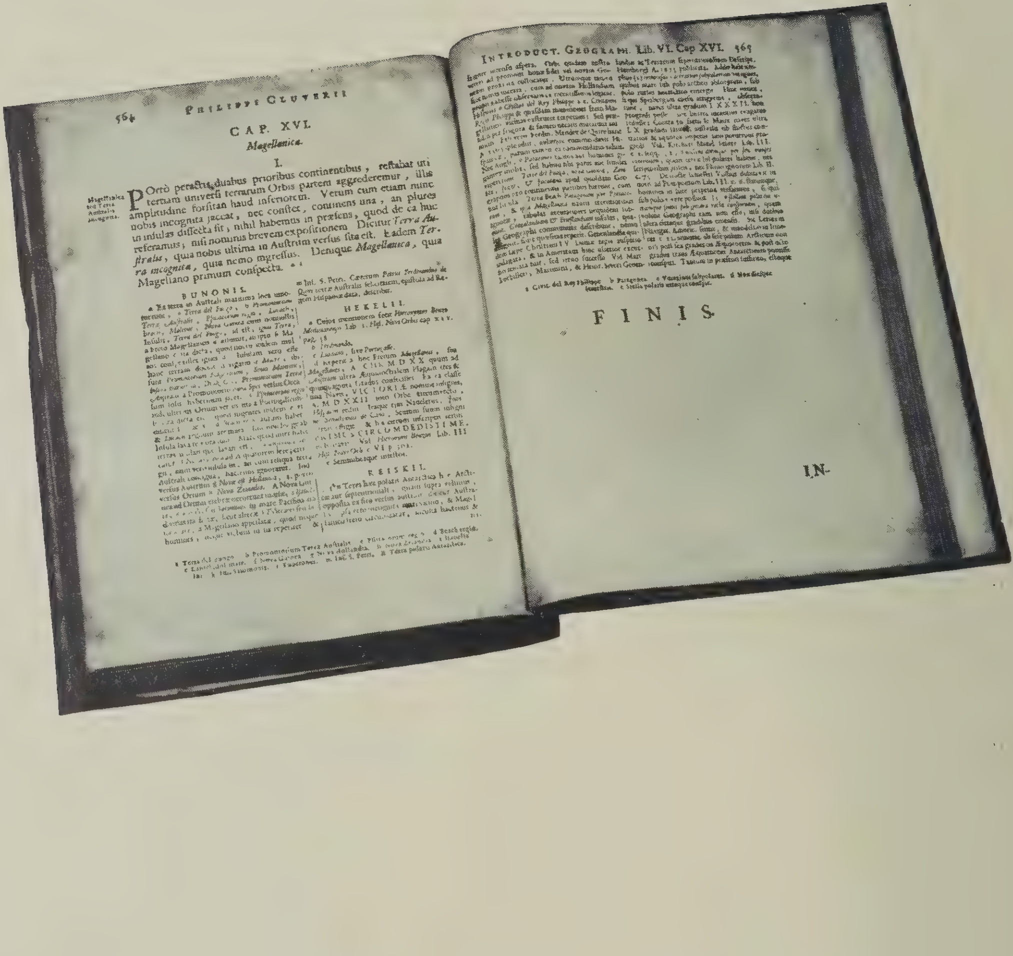

564 PHILIPPI CLUVERII

CAP. XVI.

Magellanica.

I.

Magellanica ſeu Terra Auſtralis incognita.

PORrò peractis duabus prioribus continentibus, reſtabat uti tertiam univerſi terrarum Orbis partem aggrederemur, illis amplitudine forſitan haud inferiorem. Verum cum etiam nunc nobis incognita jaceat, nec conſtet, continens una, an plures in inſulas diſſecta ſit, nihil habemus in præſens, quod de ea huc referamus; niſi nominis brevem expoſitionem. Dicitur *Terra Auſtralis*, quia nobis ultima in Auſtrum verſus ſita eſt. Eadem *Terra incognita*, quia nemo ingreſſus. Denique *Magellanica*, quia Magellano primum conſpecta.

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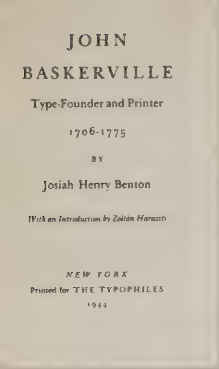
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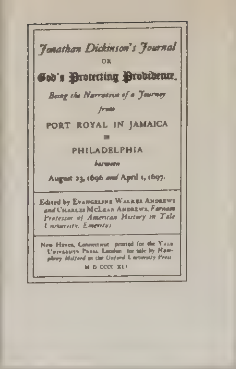
BASKERVILLE
Type-Founder and Printer
1706-1775
BY
Josiah Henry Benton
With an Introduction by Zoltán Haraszti

NEW YORK
Printed for THE TYPOPHILES
1944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OR
God's Protecting Providence.
Being the Narrative of a Journey
from
PORT ROYAL IN JAMAICA
to
PHILADELPHIA
between
August 23, 1696 *and* April 1, 1697.

Edited by EVANGELINE WALKER ANDREWS and CHARLES MCLEAN ANDREWS, *Farnam Professor of American History in Yale University, Emeritus*

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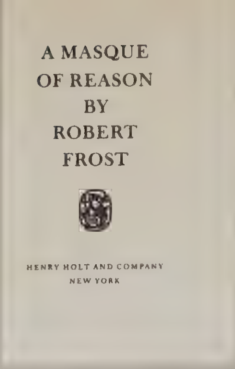
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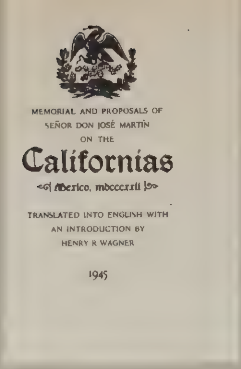
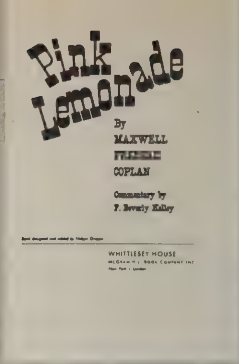

MEMORIAL AND PROPOSALS OF
SEÑOR DON JOSÉ MARTÍN
ON THE
Californias
Mexico, mdccccxli

TRANSLATED INTO ENGLISH WITH
AN INTRODUCTION BY
HENRY R WAGNER

1945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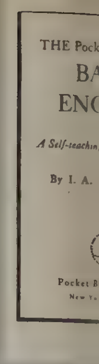
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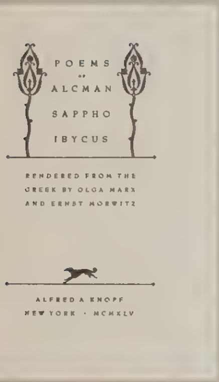
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OF
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SAPPHO
IBYCUS

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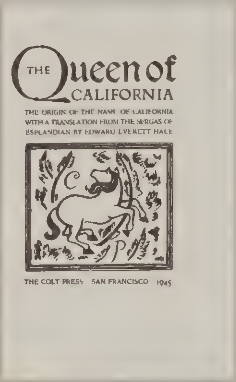
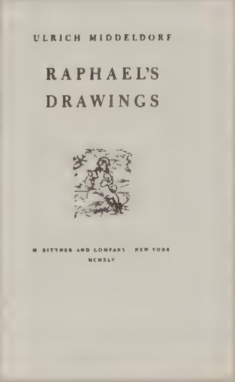
GREEK BY OLGA MARX
AND ERNST MORWITZ

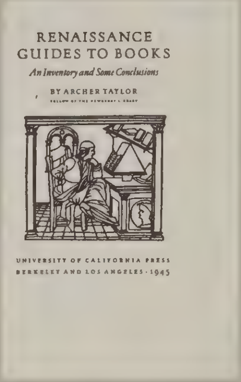
ALFRED A KNOPF
NEW YORK · MCMXLV


THE Queen of
CALIFORNIA
THE ORIGIN OF THE NAME OF CALIFORNIA
WITH A TRANSLATION FROM THE SERGAS OF
ESPLANDIAN BY EDWARD EVERETT HALE

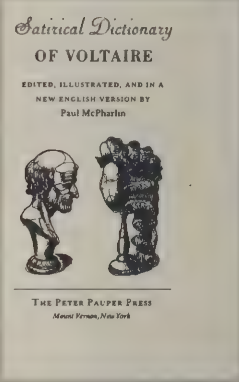
THE COLT PRESS SAN FRANCISCO 1945


ULRICH MIDDELDORF
RAPHAEL'S
DRAWINGS

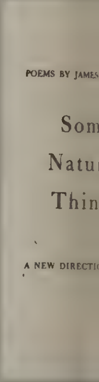
H. BITTNER AND COMPANY NEW YORK
MCMXLV


RENAISSANCE
GUIDES TO BOOKS
An Inventory and Some Conclusions
BY ARCHER TAYLOR
FELLOW OF THE NEWBERRY LIBRARY

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY AND LOS ANGELES · 1945


Satirical Dictionary
OF VOLTAIRE
EDITED, ILLUSTRATED, AND IN A
NEW ENGLISH VERSION BY
Paul McPharlin

THE PETER PAUPER PRESS
Mount Vernon, New York


POEMS BY JAMES
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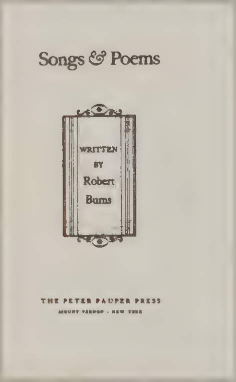
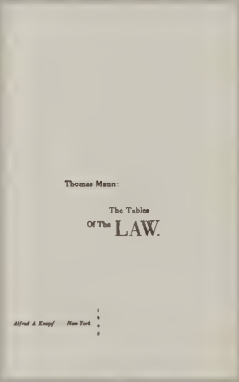
A NEW DIRECTI

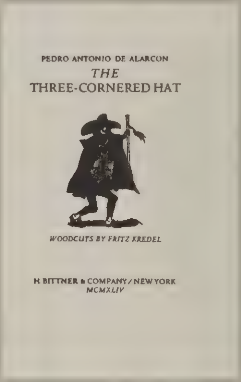
> "BOOK DESIGN IS
> ONE OF THE EXCEL-
> LENCIES BY WHICH
> A CIVILIZATION
> CAN BE MEASURED."
>
> *Monroe Wheeler*


Songs & Poems
WRITTEN
BY
Robert
Burns

THE PETER PAUPER PRESS
MOUNT VERNON · NEW YORK

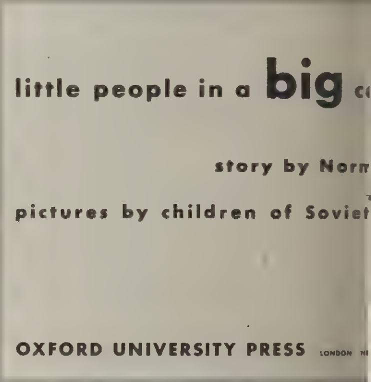

Thomas Mann:
The Tables
Of The LAW.

Alfred A. Knopf *New York*

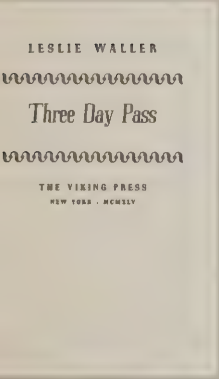

PEDRO ANTONIO DE ALARCON
THE
THREE-CORNERED HAT

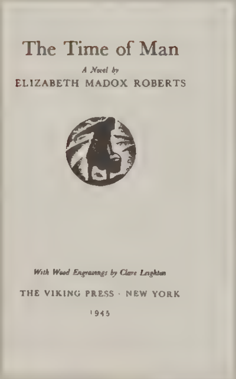
WOODCUTS BY FRITZ KREDEL

H. BITTNER & COMPANY / NEW YORK
MCMXLIV

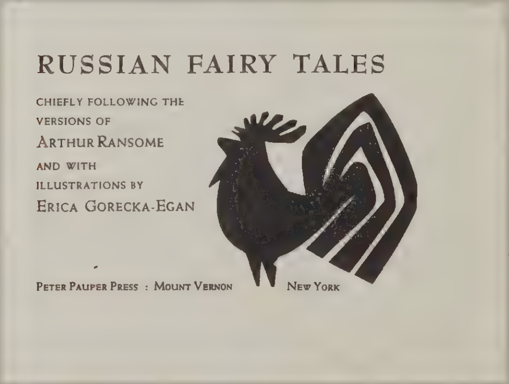

little people in a **big** c
story by Norm
pictures by children of Soviet

OXFORD UNIVERSITY PRESS LONDON N

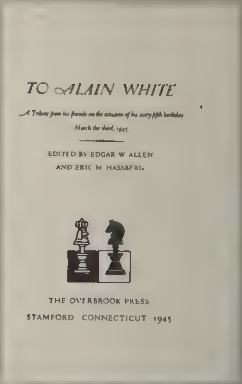

LESLIE WALLER
Three Day Pass
THE VIKING PRESS
NEW YORK · MCMXLV


The Time of Man
A Novel by
ELIZABETH MADOX ROBERTS

With Wood Engravings by Clare Leighton
THE VIKING PRESS · NEW YORK
1945

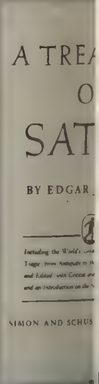

RUSSIAN FAIRY TALES
CHIEFLY FOLLOWING THE
VERSIONS OF
ARTHUR RANSOME
AND WITH
ILLUSTRATIONS BY
ERICA GORECKA-EGAN

PETER PAUPER PRESS : MOUNT VERNON NEW YORK


TO ALAIN WHITE
A Tribute from his friends on the occasion of his sixty-fifth birthday
March the third, 1945

EDITED BY EDGAR W ALLEN
AND ERIC M HASSBERG

THE OVERBROOK PRESS
STAMFORD CONNECTICUT 1945


A TREA
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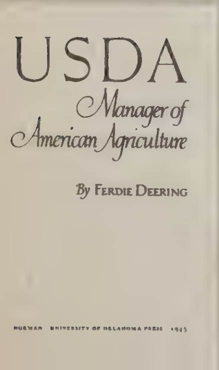
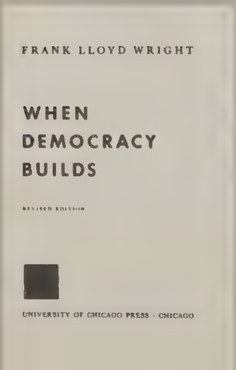
BY EDGAR

Including the World's
Tragic from Antiquity to th
and Edited with Critical
and an Introduction on the

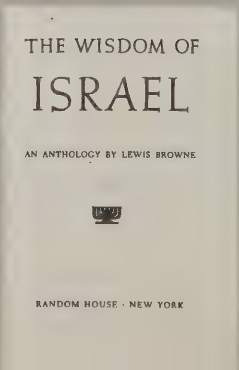
SIMON AND SCHUS


USDA
Manager of
American Agriculture
By FERDIE DEERING

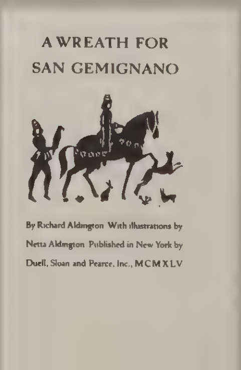
NORMAN UNIVERSITY OF OKLAHOMA PRESS 1945


FRANK LLOYD WRIGHT
WHEN
DEMOCRACY
BUILDS
REVISED EDITION

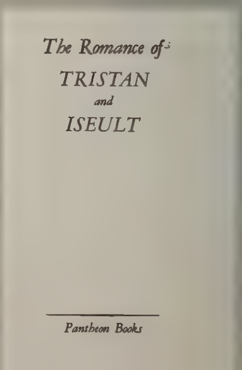
UNIVERSITY OF CHICAGO PRESS · CHICAGO


THE WISDOM OF
ISRAEL
AN ANTHOLOGY BY LEWIS BROWNE

RANDOM HOUSE · NEW YORK


A WREATH FOR
SAN GEMIGNANO

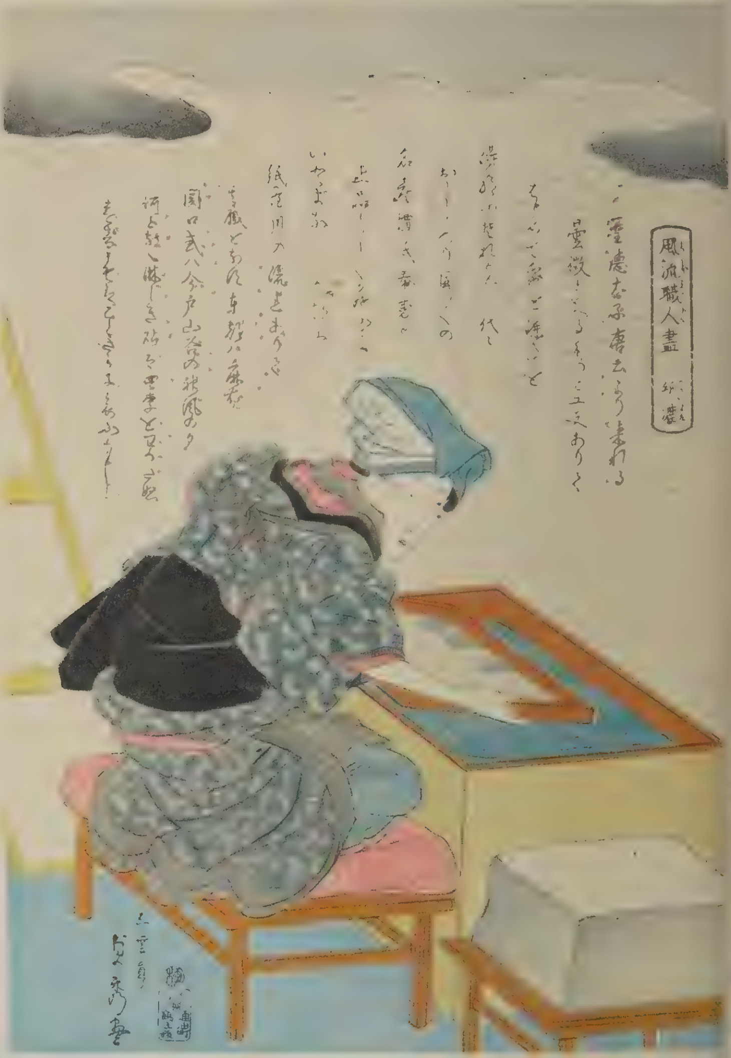
By Richard Aldington With illustrations by
Netta Aldington Published in New York by
Duell, Sloan and Pearce, Inc., MCMXLV


The Romance of
TRISTAN
and
ISEULT

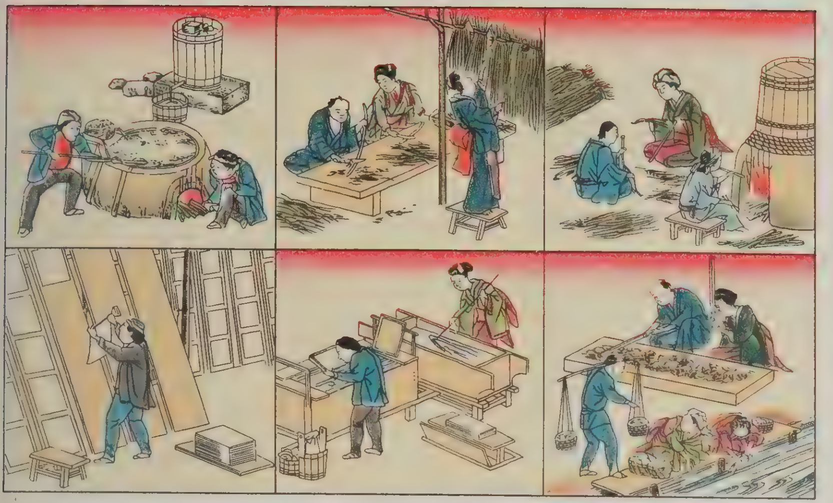
Pantheon Books

ESTHÉ
DU MA

A poem by WALLACE
STEVENS with pen &
ink drawings by Wightman
Williams, printed in July 19
The Cummington Press,



A BEAUTY MAKING PAPER *Ukiyoe* by Sadahide



HAND-MADE PAPER OF JAPAN

TOURIST LIBRARY: 39

by WILLIAM BOND WHEELWRIGHT

When the Board of Tourist Industry, Japanese Government Railways published volume 39, *Hand-Made Paper of Japan*, Copyright 1942, they little dreamed it would fall into the hands of tourists clothed in the uniforms of Uncle Sam's armed forces. At that time, "Of all the battle fronts," as General George C. Marshall reported,[1] "the situation in East Asia was the bleakest . . . The Japanese had established an immense perimeter of conquest in the Far East. By July, 1942, it extended more than half way across the Pacific, southward almost to Australia, and westward to the mountain barriers of the India-Burma front." No wonder that the Board of Tourist Industry was overconfident when the last volume of its *Tourist Library* appeared.

Fortunately for me, my son-in-law, Lt. Col. John T. Snodgrass, came across a copy of this

TOURIST LIBRARY: 39

Front cover design

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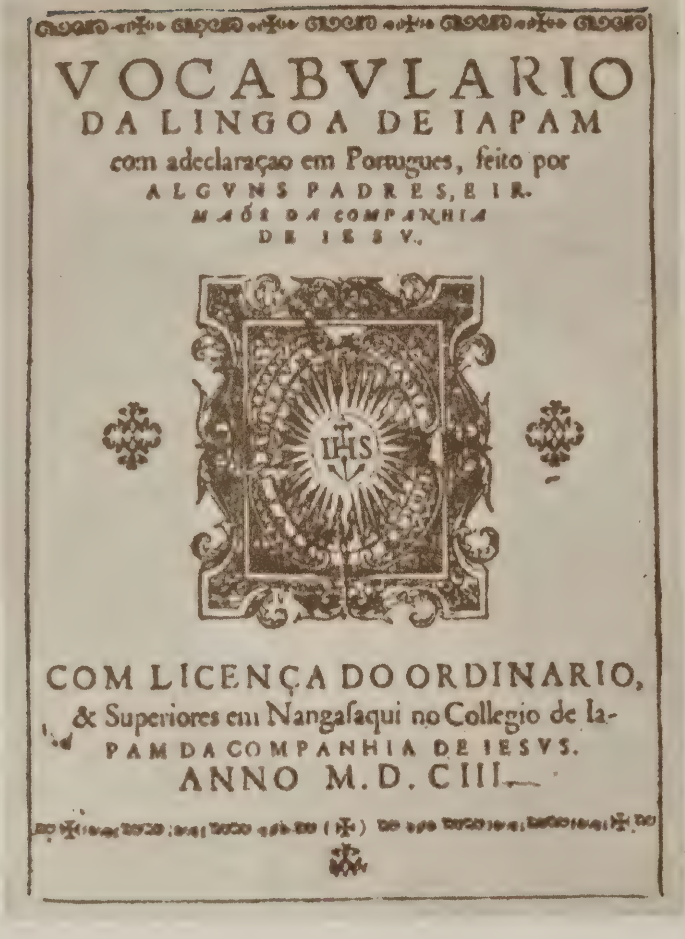
[1] Biennial Report of the Chief of Staff, Oct. 10, 1945.

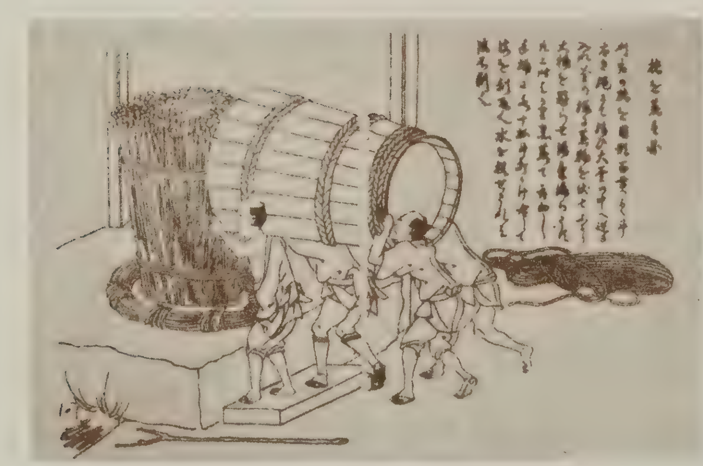
THE LIBRARY OF THE
APR 1 [illegible]7
UNIVERSITY OF ILLINOIS



VOCABVLARIO
DA LINGOA DE IAPAM
com adeclaraçao em Portugues, feito por
ALGVNS PADRES, E IR-
MAÕS DA COMPANHIA
DE IESV.

COM LICENÇA DO ORDINARIO,
& Superiores em Nangaſaqui no Collegio de Ia-
PAM DA COMPANHIA DE IESVS.
ANNO M.D.CIII.

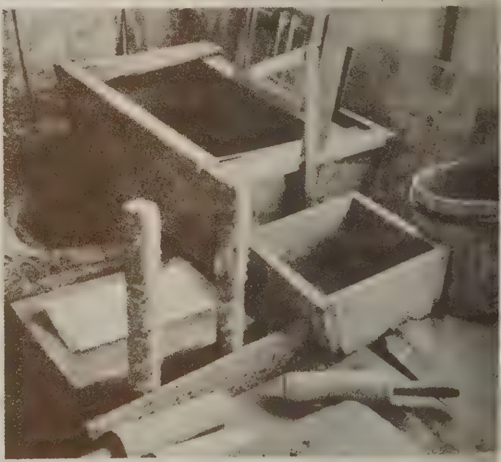
Title-page of the Japanese-Portuguese Dictionary published at Nagasaki in 1603



Steaming of *kōzo* shoots, as illustrated in the *Etizen Kamisuki Zusetu*

charming little monograph in Tokyo. It no lies open before me. Upon its receipt wrote him to buy me as many as he coul but after diligent search he was able to fi only one more copy. This one has be given to Dr. Dard Hunter for the Libra of the Paper Museum at the Massachuset Institute of Technology, for it was the on book on handmade paper lacking from h valuable collection. It is not known that a other copies have reached our shores. A d scription is consequently of interest. In eve respect this small volume is exemplary. In o country it would rate as an edition de lux The page size is five by seven inches; its te (106 pages) is printed by letterpress up ivory tinted, calendered, machine-made pap of high quality. The many illustrations a printed in sepia by gravure process; the love frontispiece is delicately reproduced from wo blocks in six delicate colors. In addition, the are fourteen inserted samples of paper abo the size of an American airmail stamp, repr sentative of typical native handmade pape The book is sewn and bound into an overha cover of double-thick cover paper with roug edges, which appear to have been made by hand paper cutter so as to suggest deck edges. Above the title is attached a picture r produced from wood blocks in five color illustrating six steps in the manufacture paper by hand.

Some of the paper-making utensils used in the province of Sinano



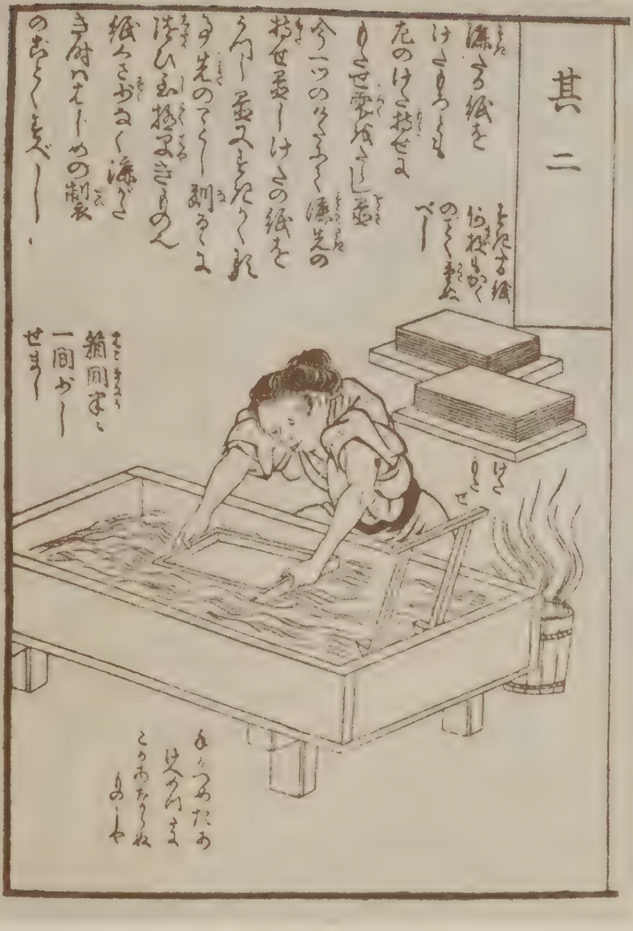
Written in excellent English, the monoaph is the work of Bunsyō Zyugaku, a Zen iest whom Dard Hunter once met at Kyōto, essed in a kimono and a derby hat! He ssessed a private press on which, among her things, he had printed his own translaon of the poems of William Blake. Evidently had made a particular study of the art ancient papermaking, for he refers in the hort Bibliography" of this treatise on *Handade Paper of Japan*, to Dard Hunter, R. H. apperton, and H. S. Parkes, of whom the t named presented to the British Parliament *ports on the Manufacture of Paper in Japan*, ndon, 1871.

The Contents of Zyugaku's monograph are vided into three parts. The *Manufacture*, the *story*, and finally, *Paper-making in Presenty Japan*. The information contained in the t two chapters is familiar to all readers of rd Hunter and calls for no comment. The t chapter will be of interest to many Ameri paper manufacturers, particularly those ose products have been converted during war years to take the place of more critical terials, and which have been endowed with perties hitherto not associated in our country h paper.

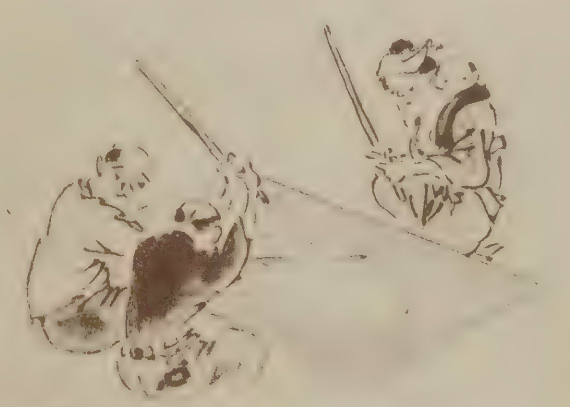
Here we take the liberty of quoting somet freely from Bunsyō Zyugaku.

"As Rein described some sixty years ago, er and its manufactured products have been d in the countries of Chinese civilization, especially in Japan, since the earliest times,

itive contrivance for squeezing the water contained in wet sheets— at Saisai-mura in the province of Tosa



A page from the *Kami-suki Tyōhō-ki* (A Handy Guide to Paper-makers), showing paper-making outfits



Beating of wet bast, shown in an old MS. book in the author's possession

Spreading out the sheets on a smooth-planed board
—at Iwasaka-mura, Izumo

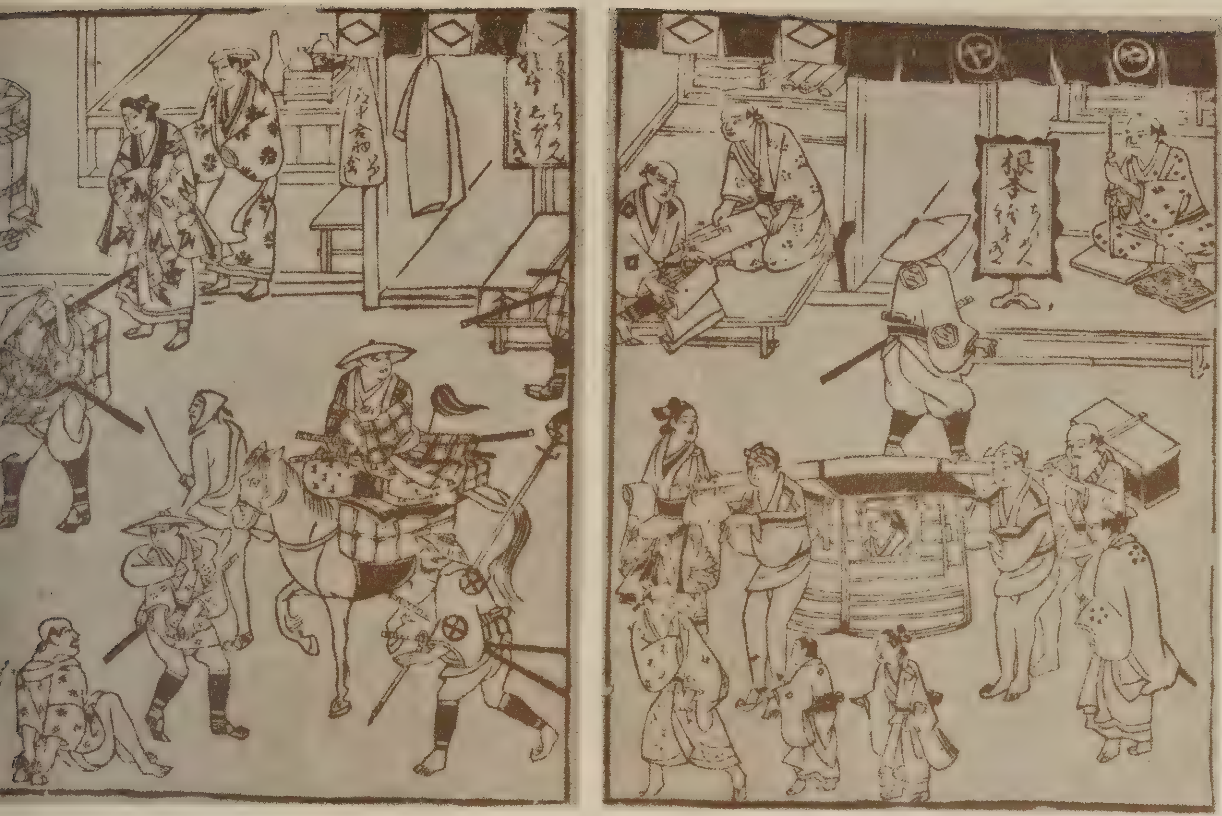
Drying the sheets in the sun—at Saisai-mura, Tosa

not only for writing, painting, printi
packing, handkerchiefs, and other detersiv
but also for fans, screens, umbrellas a
parasols, lanterns, doll's clothes, water-pr
cloaks and head coverings, tobacco bags, ca
and boxes, and for window-panes instead
glass, the beautifully made lattices of t
sliding doors being covered with it. Alm
simultaneously with Rein, the humorous p
of Basil Hall Chamberlain gave a vivid descri
tion of the Japanese way of using paper. So
part of his description is erroneous and sup
annuated; but on the whole his account s
holds good today.

"So let me quote, with some comments, t
item 'Paper' from his memorable *Thin*
Japanese, to help you understand the vario
uses we Japanese make of paper.

"'The Japanese use paper for a score
purposes to which we in the West have nev
thought of putting it, one reason being th
their process of manufacture leaves uncut t
long fibers of the bark from which the pap
is made, and consequently renders it mu
tougher than ours. Fans, screens, and lantern
sometimes even clothes, are made of paper.
sheet of nice, soft paper does duty for a pocke
handkerchief. Paper replaces glass window
and even to a certain extent the walls whic
with us separate room from room. Japane
housemaids do their dusting with little broon
made of strips of paper; and dabs of soft pap
serve, instead of lint, to arrest bleeding. O
paper is used for making umbrellas, raincoat
tobacco-pouches, and air-cushions, as well
for protecting parcels from the wet in a mann
of which no European paper is capable. Pap
torn into strips and twisted takes the place
string in a hundred minor domestic uses. V
have even seen traces of a harness mend
with it, though we are bound to say that t
result, with a restive horse, was not altogeth
satisfactory. Then, too, there is the so-call
leather paper, which is used for boxes and mo
recently for dados and hangings, and the crê
paper now familiar abroad as a material f
doilies and illustrated booklets.'

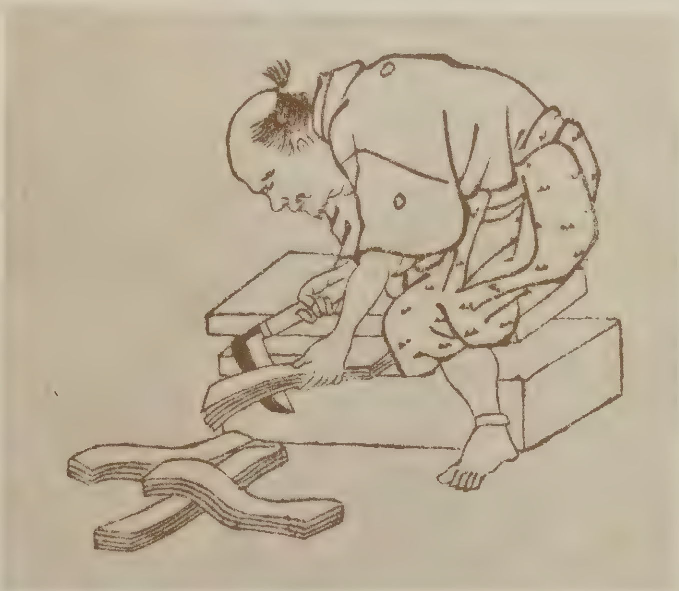
"Chamberlain's fear that a harness mend
with paper strings was not altogether sat



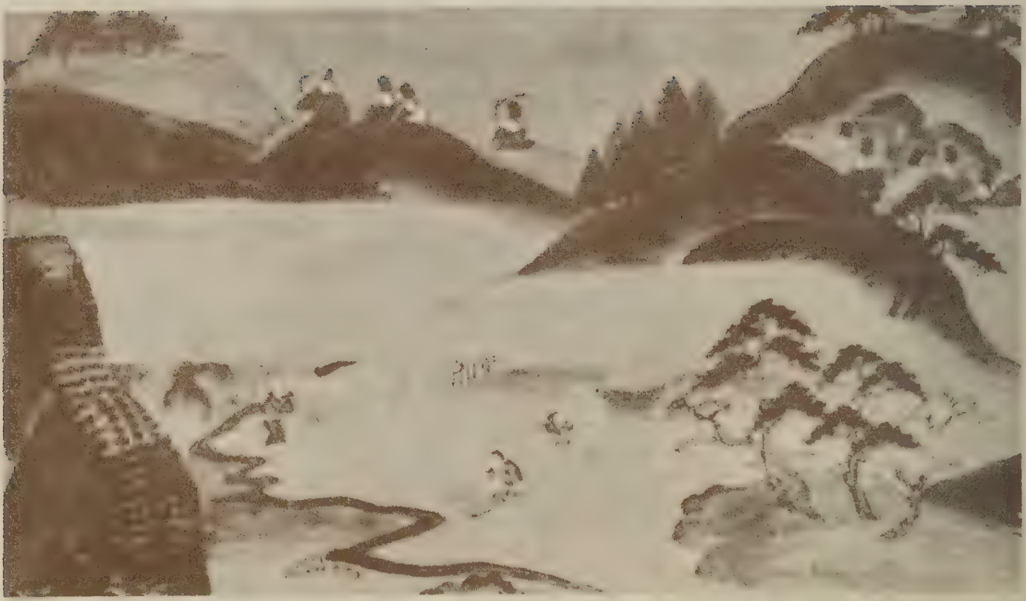
Kamiko-store at Abekawa on the Tōkaidō Highway, as illustrated in one of Saikaku's works of the 17th century

tory is baseless, if the strings were tanned or
quered as is the case with *sihu* of Siroisi;
y are as strong as any cotton threads or iron
es."

All the objects described in the passages
ted were of handmade paper, the product
many individual craftsmen. According to
rd Hunter's *A Papermaking Pilgrimage to*
an, Korea and China, published in 1936,
census of the handmade paper industry
ld show between twelve and fifteen hundred
vidual mills, each operating from one to
y vats." As these were located in country
ricts it is probable that many survive, but
still await reliable information in the hope
this may be so. Just how this ancient
e may be affected by the results of war is as
undisclosed. According to Zyugaku, "Paper-
ing by hand in Japan will not perish so
as we are faithful to the Japanese way of
g, and I believe there will be no change in
faithfulness."



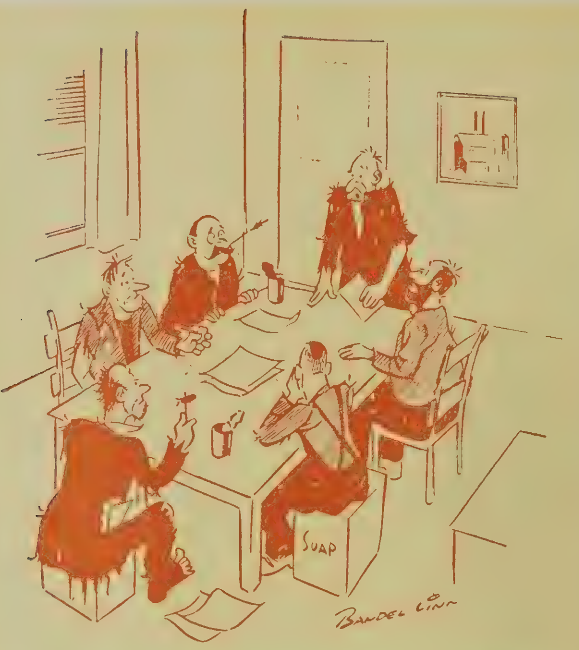
Paring the finished paper. An illustration taken from the *Kami-suki Tyōhō-ki*



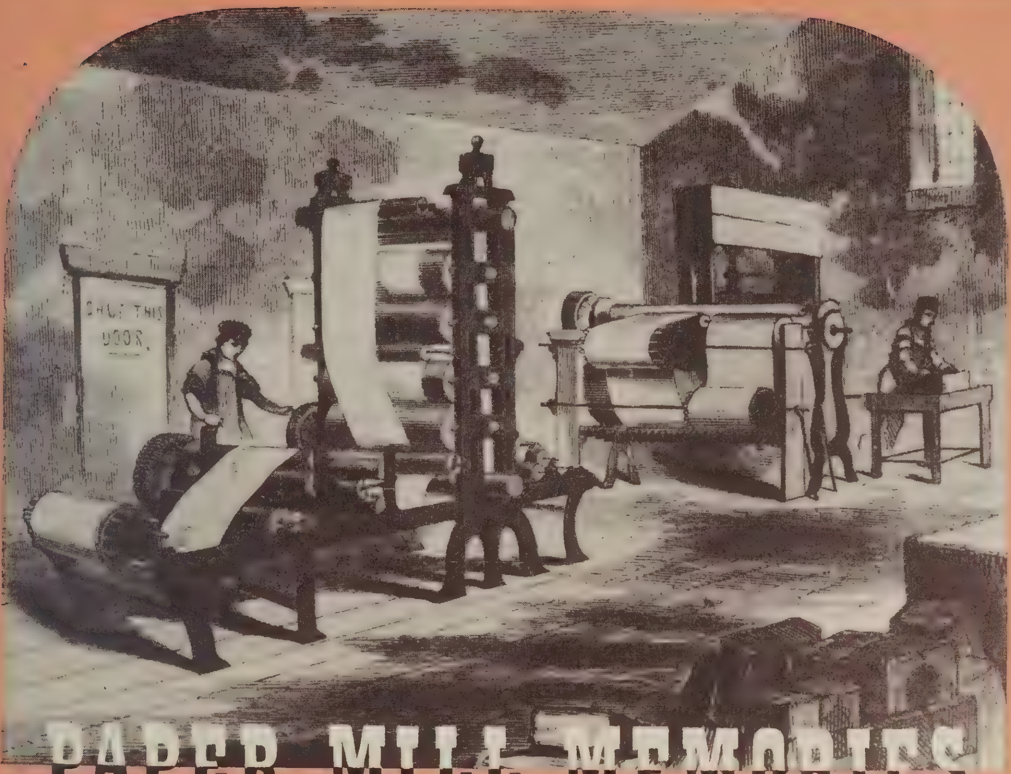
The oldest paper-making picture extant. This is a part of the picture-scroll giving the story of Kōbō Daisi, the founder of the Singon sect of Japanese Buddhism. The scroll was completed in the fourteenth century and now is preserved in the Tō-zi Temple of Kyōto as a national treasure

CELLULOSE RESEARCH

Electron micrograph of fragments of a mechanically dispersed cotton linters fiber showing the fibrils or building units and their arrangement in ribbons within the native cellulose fiber. At this magnification (66,000 X) a single cotton linters fiber would have a diameter of over 4 feet and a length of about 400 feet. These remarkably clear details of fiber structure were obtained through application of a new technique applied during the course of Hercules research on cellulose.



"As you know, gentlemen, this has been the worst year of the company's history."


SHUT THIS DOOR.

PAPER MILL MEMORIES

"Fond memory brings the light of other days around me."

THOMAS MOORE

NEWS SNATCHES GATHERED FROM THE TRADE PRESS OF YEARS AGO

by HARRY E. WESTON

Crocker, Burbank & Co. will have running, ut January 1, 1881, a 92-inch Fourdrinier chine, with calender rolls 16 inches in diameter, inch driers, and a 36-foot wire. This machine is w being made by the Union Machine Co., chburg, Mass., and no expense is spared to ke it one of the best in this country. *The per World 1, No. 12: 26* (*December, 1880*).

Kimberly, Clark & Co.'s new mill at Apple- , Wis., will contain eight 600-pound engines one Jordan engine. The machine will be an nch Fourdrinier. *The Paper World 2, No. 4: 27* (*ril, 1881*).

The L. L. Brown Paper Co. are the only manufacturers of handmade paper in this country, a venture they began about two years ago, with very satisfactory results. They have just begun another new feature in the production of a filtering paper for the use of druggists, chemists, etc. Tests recently made show that they are producing a better article than the imported. *The Paper World 8, No. 6: 19* (*June, 1884*).

The origin of the paper flour sack manufacture is traced to Hon. James Arkell, senior member of the firm of Arkell & Smiths, Canajoharie, N. Y. . . .

Washing and beating rags, about 1860.

From 1863 to 1865 the manufacture and trade in cotton sacks had almost wholly dried up, and this firm, seeing clearly that its business was fraying down to more than a ragged edge, commenced a series of experiments in several paper mills to produce a paper of the requisite toughness and tensile strength to bear the abrasion and strain incident to the transportation of flour . . .

It was not long before it was found that old manila rope that had been used in rigging on water craft, had all the requisite strength and was cheap enough, while a large part of the stickiness of the new fiber was worked out of it by the usage. So the old rope that papermakers had hitherto considered a nuisance and thrown away, was utilized for the new paper flour sack.

Many experiments were made for Arkell & Smiths on paper from new materials and by new processes by Messrs. J. A. Manning and Reuben Peckham at their mills in Troy, N. Y., and in 1868 they and Warren Paine became associated with Arkell & Smiths in the ownership of two mills in Troy, and in 1882 with a third one at the same place. The Paper Flour Sack Industry, *The Paper World 9, No. 4: 1, 2 (October, 1884)*.

It is interesting to find out who makes the most paper of all the manufacturers in the United States and undoubtedly in the world. He is t
Hon. William A. Russell, of Lawrence, Mass.
his various paper and pulp enterprises at La
rence, Bellows Falls, Vt., Franklin, N. H., a
Brunswick, North Gorham, Livermore Falls, a
South Windham, Me., he makes 56 tons of new
9 of heavy manilas, 2 of book, 2 of flat cap a
blotting, 24 of box board and 75 tons of wo
pulp; these are 69 tons of paper, 93 tons of pap
and boards and 168 tons of everything, includi
wood pulp. His largest works are at Bellows Fal
where he is the principal owner of the water pow
of the Connecticut River, amounting to 12,000
14,000 horsepower. *The Paper World 10, No. 1:*
(January, 1885).

Toilet, or closet, paper was first made
C. H. Dexter & Sons, Windsor Locks, Conn., abo
the time of the civil war. The first brand was t
famous "Star" paper, that, for a long time, w
the sole or principal one seen. The development
this specialty was slow and but an exceeding
small quantity was made for years. The next o
to make the paper a few years after the Dexte
was John Robertson, a family name well known
papermaking in Vermont and New Hampshi
His mill was then at Putney, Vt., and he made
little at first, using the "Eagle" brand. John

oore was the superintendent of the mill, and in 72 these gentlemen entered into partnership d established a mill at Bellows Falls, Vt., for aking tissue manila and toilet papers, but they parated in 1881, when John Robertson & Son ent into a new mill in that village. *The Paper orld 10, No. 1: 19 (January, 1885).*

A ten-ton paper mill is in course of construc- n fifteen miles below Harrisburg, Pa., on the squehanna river. The name of the firm is the rk Haven Paper Co., and their capital is $250,-). *The Paper World 10, No. 2: 18 (February, 85).*

The Kimberly Clark Company of Appleton, s., have recently lighted their mills with the estinghouse system of incandescent electric nts. *The Paper World 13, No. 4: 26 (October, 36).*

The new three-ton paper mill, recently ablished at Excello, Ohio, by the Harding per Company, of Franklin, Ohio, is said to be of the best equipped mills in the Miami ley. *The Paper World 14, No. 5: 26 (May, 1887).*

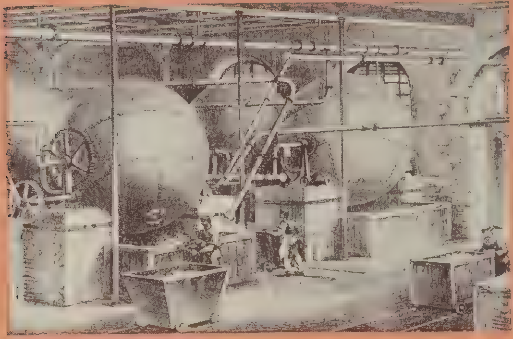
The old Miami Paper Mill of Beckett, Laurie & Co., at Hamilton, O., built in 1849, and one of the landmarks of the paper industry in Ohio, is being completely rebuilt and will be when completed one of the model mills of the West. The Lauries have sold their interests to the Becketts, who will have sole control. The new mill will have two Umpherston engines of 600 pounds capacity each, two of the Stout Mills & Temple washers, new beaters, two Hercules wheels and a Black & Clawson machine. *The Paper World 16, No. 6: 14 (June, 1888).*

Millwright E. D. Jones, of Pittsfield, Mass., is building a large mill for the Ontario Paper Company at Watertown. He furnishes the drawings, superintends the work, and will put in the machinery. Robert S. Francis, long in the service with Mr. Jones, is foreman of the job. *The Paper World 17, No. 4 : 18 (October, 1888).*

The town of Johnsonburg is a bright example of what a paper mill and pulp works may do. Two years since the place had but six houses; now the population is nearly 2,500, and the opening of winter found 200 houses being built there. *The Paper World 22, No. 1: 17 (January, 1891).*

Plating paper, 1885.

The Mead Paper Company are rebuilding the mill recently purchased by them at Chillicothe, Ohio. Among the machinery included in the purchase was a paper machine which had been in use since 1836. Its capacity was a 30-inch sheet, the calender stack consisted of two rolls, about a foot in diameter, and the dryers were of the same size. *The Paper World 22, No. 2: 13* (*February, 1891*).



Rotating washers of an earlier day.

Work has already begun on the Marinette and Menominee Paper Company's new mill at Marinette, which will have two machines, 106 and 86 inches wide, respectively, twelve 1,000-pound engines, eight wood pulp grinders and a sulphite or soda plant. It will cost $300,000, use 3,000 horsepower of water, and is expected to be in operation early next winter. *The Paper World 22, No. 6: 24* (*June, 1891*).

The Rittenhouse Memorial Association has been incorporated by the State of Pennsylvania, its object being the erection of a monument to commemorate the building of the first paper mill in America. The site of the mill was on the Wissahicken, at Germantown, Pa., and the structure was erected in 1690 by William Rittenhouse, a German papermaker who came from Arnheim on the Rhine. Dr. Alvah Rittenhouse is at the head of the movement. *The Paper World 23, No. 5: 39* (*November, 1891*).

It takes 1,000 sheets of the thinnest tissue paper to make an inch in thickness. To quote the words of a prominent papermaker: "You run machine all day on tissue, and get nothing; whil half of that is spoiled in finishing." *The Pape World 24, No. 3: 41* (*March, 1892*).

The Puget Sound Pulp and Paper Company who have a capital stock of $500,000, have nearl completed their extensive plant near Everett Wash., the works and yard of which occup twenty-eight acres. The main building is 80 b 412 feet and two stories high; the central portion of brick, is 36 by 80 feet and 44 feet high. Th machine room and warehouse are each 52 by 16 feet, two stories. The mills will be supplied wit the very best machinery. There will be fou welded steel digesters, seven feet in diameter an twenty-eight feet high. One of the paper machine is 106 inches wide, the others, 90. They hav fifteen dryers each. There are three steam engines with a total of 400 horsepower, four 1,000-poun Horne engines, and two Jordans. Henry Hewitt Jr., of Tacoma, Wash., is president, and Co A. G. Paine, of New York, vice-president o the company. *The Paper World 25, No. 1: 1* (*July, 1892*).

The Plover Paper Company, recently organized to build a paper mill at Whiting, on the Wisconsin river, have selected a site about two and half miles below Stevens Point and a half mil below the plant of the Wisconsin River Pape and Pulp Company. Between the two, flows th Plover river from which the company takes it name. The blasting for the wheel pit was commenced the last week in August, and the compan expects to make paper by February next. The entire mill from one end to the other will be built o a solid piece of granite. The beating engine roo will be 208 feet long by 64 feet wide. It will contain twenty washing and beating engines and tw Jordan engines. The machine building will be 20 feet long by 64 wide and will be two stories higl It will contain two Fourdrinier paper machine one thirty-six and the other, 108 inches wide. Onl the finest kind of machine-dried super calend papers will be made. The capacity will be fiftee tons of paper daily, and 175 hands will be employed in the mill. The officers of this compan are: President, George A. Whiting; vice-presiden

mmons Burr; secretary, C. A. Babcock; trea-
urer, C. E. Edwards. *The Paper World 24, No. 4:*
6 (October, 1892).

The exhibitors of paper at the World's Fair
eceived the following awards:

Whiting Paper Company, Holyoke, three
wards—bond paper; envelopes and fine folded
riting paper; bristol board.

Hurlbut Paper Manufacturing Company,
outh Lee—writing paper in packages and
oxes.

Z. & W. M. Crane, Dalton, three awards—
asted boards; writing paper; general exhibit.

Crane & Co., Dalton, three awards—bank
ote paper; bond paper; parchment paper.

Byron Weston Company, Dalton—ledger
aper.

L. L. Brown Paper Company, Adams—
dger paper.

Crane Brothers, Westfield, three awards—
nen paper; writing paper; ledger paper.

The Thompson Norris Company, Brooklyn,
. Y.—corrugated paper.

Weston Paper Manufacturing Company,
ayton, O., two awards—roll paper; holders for
ll paper.

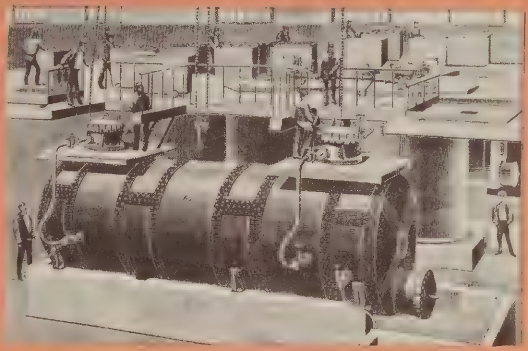
Denver (Colo.) Paper Mills—material for
anufacture of paper.

Crosby Paper Company, Marion, Ind.—
ılp-lined strawboard.

Western Paper Bag Company, Batavia, Ill.,
o awards—paper bags; paper in rolls. *The*
aper World 27, No. 5: 8 (November, 1893).

Paper making was once an important and
rge industry on Long Island, and on almost every
ream there was a paper mill. As late as twenty-
e years ago, there were fourteen paper mills on
e island. Straw, however, in later years could
procured much cheaper to the West, and the
per mills one by one went out of use, not being
le to compete with their more fortunate rivals
ich followed the star of the empire westward.
ere is now only one mill on Long Island
gaged in the manufacture of paper. It
at Patchogue and makes asbestos fire-
oof paper. *The Paper World 30, No. 2: 73*
ebruary, 1895).

September—The Rumford Falls Paper Company, of Rumford Falls, Me., started up its new 162-inch Fourdrinier, the widest in the world, and made a sheet of paper 152 inches wide. *The Paper Mill and Wood Pulp News 20, No. 52: 10, 12 (December 30, 1897)*.



Treating cellulose with bisulphate of lime, 1890.

The Bryant Paper Company's mill, at Kalamazoo, Mich., started up something over a year ago with one machine, built by the Beloit Iron Works, of Beloit, Wis., with the capacity of about 80 tons per week. The company has recently placed another machine, a duplicate of their first one in every respect except that it makes paper 114 inches wide. One hundred and twenty-four inches is the width made by the first machine. These ponderous machines are marvels in more than one respect. These are probably the largest book paper machines in the country. The new machine is about 145 feet in length and weighs over 200 tons. *The Paper Mill and Wood Pulp News 21, No. 2: 32 (January 13, 1898)*.

The paper mill in the eastern part of the city of Carlyle, Ill., is now being operated day and night. The plant is owned by the Carlyle Paper Company, and seventy-five persons will be employed there all the year. The daily capacity of the mill is fifteen tons of paper. The mill, which is a new one, was started up on August 31, and its first run of paper was made to fill an order from the Carlyle Banner. *The Paper Mill and Wood Pulp News 21, No. 35: 30 (September 1, 1898).*

The Bedford Pulp and Paper Company, of Big Island, Va., has been incorporated. The officers are: President, Leroy E. Brown, Richmond; secretary and treasurer, Oscar Cranz, Jr., Richmond; directors, the above and E. H. Ferguson and Wallace F. Brown, Richmond, and James G. Balfour, of Philadelphia. L. A. Sadler, of the Sadler Paper Company, has been made general manager. The company has bought the Big Island Paper Mills. *The Paper Mill and Wood Pulp News 21, No. 44: 2 (November 3, 1898).*

Appleton, Wis., February 4—The new paper mill of the Menasha Paper Company, at Ladysmith, on the Flambeau River, which has been under construction since last spring, has been started up and is now running on print paper . . .

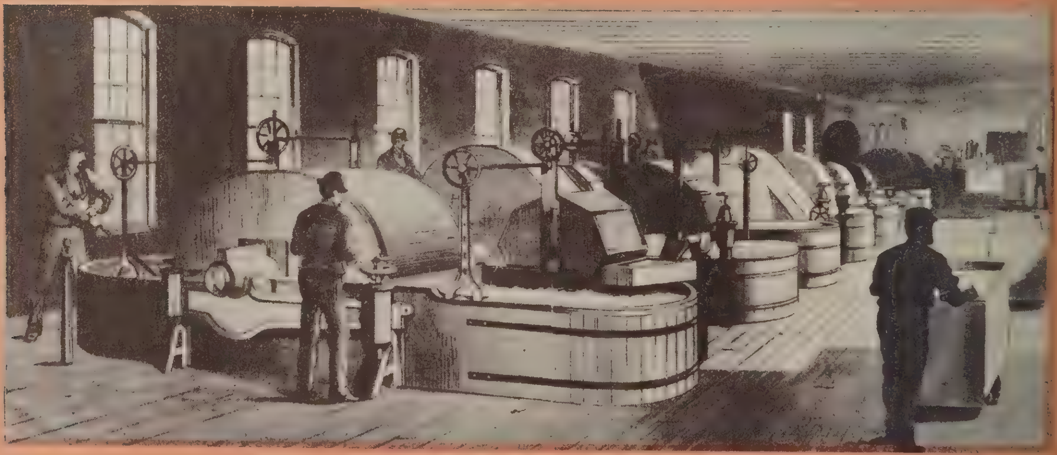
The mill of the Flambeau Paper Company, at Park Falls, is now in operation and is running on print paper, with manila and fiber papers to be added in the spring. The electric light plant of the mill is also to be enlarged to supply street and domestic lighting for the village. *The Paper Mill and Wood Pulp News 26, No. 6: 18 (February 7, 1903).*

One of the cities of the West in which grea progress has been made in the paper industry i late years is Kalamazoo, Mich. The mill of the Superior Paper Company in that city was buil and practically finished in 1901, and its firs machine was started up soon after the new year. Its full production has been on the market during the greater part of 1902.

One year ago, workmen were engaged i laying up the foundation walls of the mill of the King Paper Company's mill at Kalamazoo. The mill has been making paper since the early fall. *The Paper Mill and Wood Pulp News 26, No. 9: 66 (February 28, 1903).*

Tonawanda, N. Y., March 19—The large plant of the Tonawanda Board and Paper Company on Goose Island began to manufacture paper board on Saturday last. At present, only one-half of the plant is being operated, but as soon as the remainder of the machinery is in position, the plant will be run at its full capacity. About 150 men are employed in the paper mill, which number will be increased to 400 before the opening of spring. The paper turned out of the mill today was of the chip board grade. *The Paper Mill and Wood Pulp News 26, No. 12: 2 (March 21, 1903).*

Lafayette, Ind., December 9—Within a few weeks the Lafayette Straw Board Company's



The manufacture of book paper, 1880.

ant here will begin operations, giving employ- ent to 125 men at the outset. Thirty tons of ished straw board will be turned out every y of the year. *The Paper Mill and Wood Pulp ews 26, No. 50: 1 (December 12, 1903).*

April—The mill of the Millers Falls Paper ompany, at Millers Falls, Mass., was started up. *he Paper Mill and Wood Pulp News 26, No. 52: 6 (December 26, 1903).*

Appleton, Wis., January 11, 1904—As a sult of the recent visit here of Architect George Hardy, of New York, plans for the new book per mill of the Kimberly & Clark Company, Kimberly, have been considerably forwarded. is expected that it will take a year to build the ll and get it in operation. The Kimberly & ark Company is desirous of having the plans d specifications completed so that contracts y be awarded in the spring as early as work n be commenced. *The Paper Trade Journal 38, . 2: 44 (January 14, 1904).*

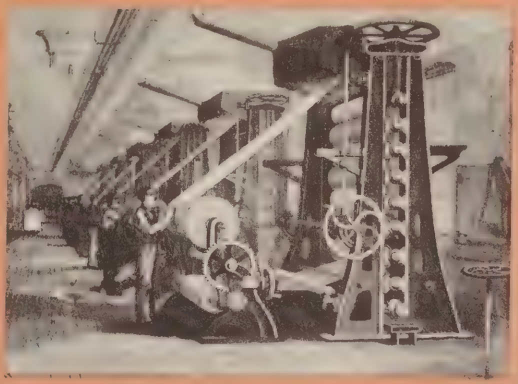
The Carew Manufacturing Company, of uth Hadley Falls, Mass., is receiving many npliments on the handsome pictures of its l recently distributed to the trade. The several tures . . . show the different periods in the mill tory from 1848, the time of its organization, he present time. The original mill, . . ., was first paper mill in the Connecticut Valley, of wooden construction, and had a product of ut 1,200 pounds in twenty-four hours. This cture was destroyed by fire in 1871, and was nediately replaced by a brick mill . . . capable urning out 5,500 pounds—a large product in e days. Since that time, the mill has been en- ed twice. In 1892 another machine was added, the production increased to 5 tons per day. 900 the last addition increased the output to 00 pounds in twenty-four hours. *Paper Trade nal 38, No. 11: 418 (March 17, 1904).*

Kalamazoo, Mich., March 14, 1904—The Paper Company is soon to start work on its mill to be erected in Vicksburg, 14 miles n of this city. The plans are nearly completed, material is arriving daily on the grounds . . .

Engine room of a paper mill, 1884.

Just at this hour the officers of the Lee Paper Company are congratulating themselves on their choice of superintendent of the mill. They have secured the services of W. H. Goodenough, of De Pere, Wis., who has had many years' experience as superintendent of one of the loft dried mills of the American Writing Paper Company. He learned his trade in England . . . His son, Charles F. Goodenough, will be assistant superintendent. *Paper Trade Journal 38, No. 11: 416 (March 17, 1904).*

Appleton, Wis., July 26, 1904—The Winnebago Paper Mills at Neenah have just been sold to D. W. Bergstrom, a former stove manufacturer of Neenah. He will take possession August 15. The consideration is not made public. *The Paper Trade Journal 39, No. 4: 6 (July 28, 1904).*

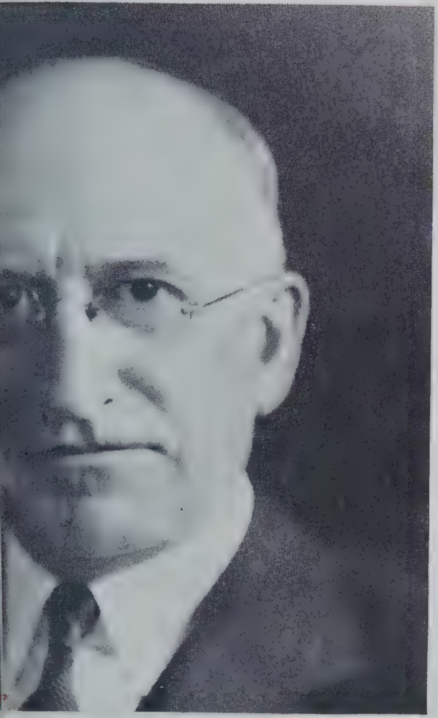


Super calender rolls, 1898.

THE HOPE OF REWARD SWEETENS LABOUR.

HONORS TO THESE MEN

A page of bouquets handed to men who have contributed to the development of the art and practice of papermaking past and present.



TO KARL E. STANSBURY — for his career of more than 40 years (beginning 1906) with a Badger State pulp and papermaking organization—a firm, founded in 1883, that is credited with installing the first Yankee machine to be built in the United States (1895), also placing in operation one of the first sulphate pulp mills in the country (1912), likewise pioneering in the manufacture of a number of grades of paper, such as glassine, greaseproof, and special wrappings—all production today being concentrated in a mill which has a daily productive capacity of 140 tons of sulphate pulp and 160 tons of paper, the paper being made on three Fourdriniers and five Yankees, the operation also including a bag factory which produces grocery, millinery, notion and special bags, and a converting department for embossing, printing, supercalendering, waterproofing, and waxing; for his active leadership of this firm as president since 1936; for his interest in education as evidenced by his graduation in 1901 from one of Wisconsin's well-known liberal arts colleges and of which he is today a trustee—also by his trusteeship of the Institute of Paper Chemistry; for his other business affiliations that add breadth to his industrial leadership; for his sociability as revealed by several fraternal and social club memberships; and particularly for his good sense of humor and down-to-earth qualities that make him a "friend to man."

TO JEAN PAUL ROLLAND — for his family lineage and its long connection with the pulp and paper industry of Canada, his grandfather having established in 1882 within the province of Quebec the first paper mill in Canada to make high-grade bond, writing, and ledger papers; for his practical training as a papermaker received under the splendid tutelage of his father; for his appointment in 1928, only three years after entering the industry and continuing to the present, as manager of the older and larger of the two mills of the company—the second mill having been built in 1902 to produce a line of bond, envelope, text, and writing papers; for his more recent increased duties as vice president of the firm to which he has contributed substantially in improving the technique of mill operations; for his desire to learn more about pulp and papermaking and industrial management and to be helpful to others interested in the same fields as evidenced by his membership in the Canadian Pulp and Paper Association, Technical Association of the Pulp and Paper Industry, American Pulp and Paper Mill Superintendents Association, National Association of Purchasing Agents, Canadian Manufacturers Association, Supreme Council of the Technical Association of the Province, and other related or allied groups; for his membership in several fraternal, social, and athletic organizations which exemplifies a desire for fellowship that goes beyond the confines of business; and especially for his love of the great out-of-doors; equestrian, golfer, fisherman, hunter—where true enjoyment comes from "playing the game."

youth

It is an errant airiness . . . a verdant verve
living in the moment and never losing momentum

It is a touch-contact with spontaneous springs—
laughter out of the heart that makes the whole world smile

It is spinning around sweet nothings and weaving silken spells
seeing stars and dreaming wideawake

It is swift ecstasy . . . delightning!
ringing bells and opening doors

It is a rabbit-footed wandering in fields of clover
sliding down rainbows and landing in pots of gold

It is a skip-contact with reality
dancing from impact to impact!

It is a wide-eyed credulity that admits wondrous visions
being in one's pristeens . . . charged with an elf-confidence that strikes a rapt aptness

youth . . . it's being an opulent virillionaire!
a humming-tingling that wins miracles
with a song.

— *P. K. Thomajan.*

The Paper Mills' Biggest Customer

THE STORY OF THE PAPER USED BY OUR GOVERNMENT PRINTING OFFICE

By WHEELER O. HOLMES

AVING just completed a lengthy period of operations during which an average of 25 crloads of paper a day was used and as much as $0,000,000 worth of business a year handled, the ntion's biggest printing plant, the Government Printing Office, is slowly getting back to normal.

'Normal" to this huge printing plant means bsiness which requires an average of ten carloads o paper a day—the largest requirement for any sigle printing establishment in the nation. It is nw down to about 14 carloads daily.

This is a far cry from 1861 when the Congress of h United States appropriated money for the esablishment of its own modest printing plant on h same Washington, D. C., site where the Gvernment Printing Office is still located.

s a part of the Legislative Branch, the Governnt Printing Office "handles" most of the printn and binding for the Federal Government. The rd "handles" is used advisedly because the ss of work has become so great that substantial untities are subcontracted to private shops.

he varied activities of the Government Print- Office are directed by Augustus E. Giegengack, who holds the title of Public Printer. Mr. Giegengack, who was appointed in 1934, is the 13th Public Printer. At the present time approximately 7,000 employes work in the Government Printing Office building in Washington.

The Government Printing Office does not print postage stamps, paper money, or Government bonds. However, it does print the Congressional Record, approximately 300 other periodicals, 300,000,000 money orders, and 370,000,000 individual and corporate income tax forms yearly, and penny postcards at the rate of 22,000 a minute. At any given time it has approximately 10,000 individual jobs in process.

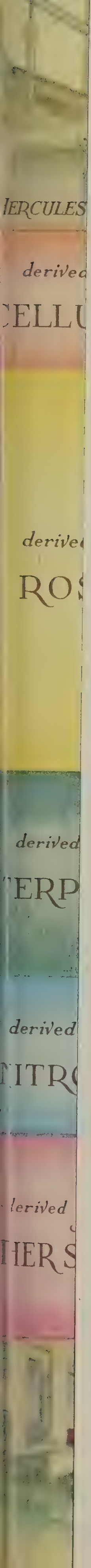
In addition the Government Printing Office is frequently called upon to do special jobs with little or no advance notice, as for instance the recent printing of 30,000,000 applications for Terminal Leave Bonds.

Jobs like these tax the ingenuity of the office and keep the 188 presses and 222 composing and typesetting machines busy.

The problem of purchasing paper stock for its many regular and special jobs is a difficult one, even in normal times. In fact, a spokesman for the

Sources and Uses of Principal Hercules Products

The two vertical columns at the left on the following chart give (1) the source of principal Hercules products, and (2) the names of these products. The horizontal column at the top, repeated at the bottom for ease in reading, shows where these Hercules products are used.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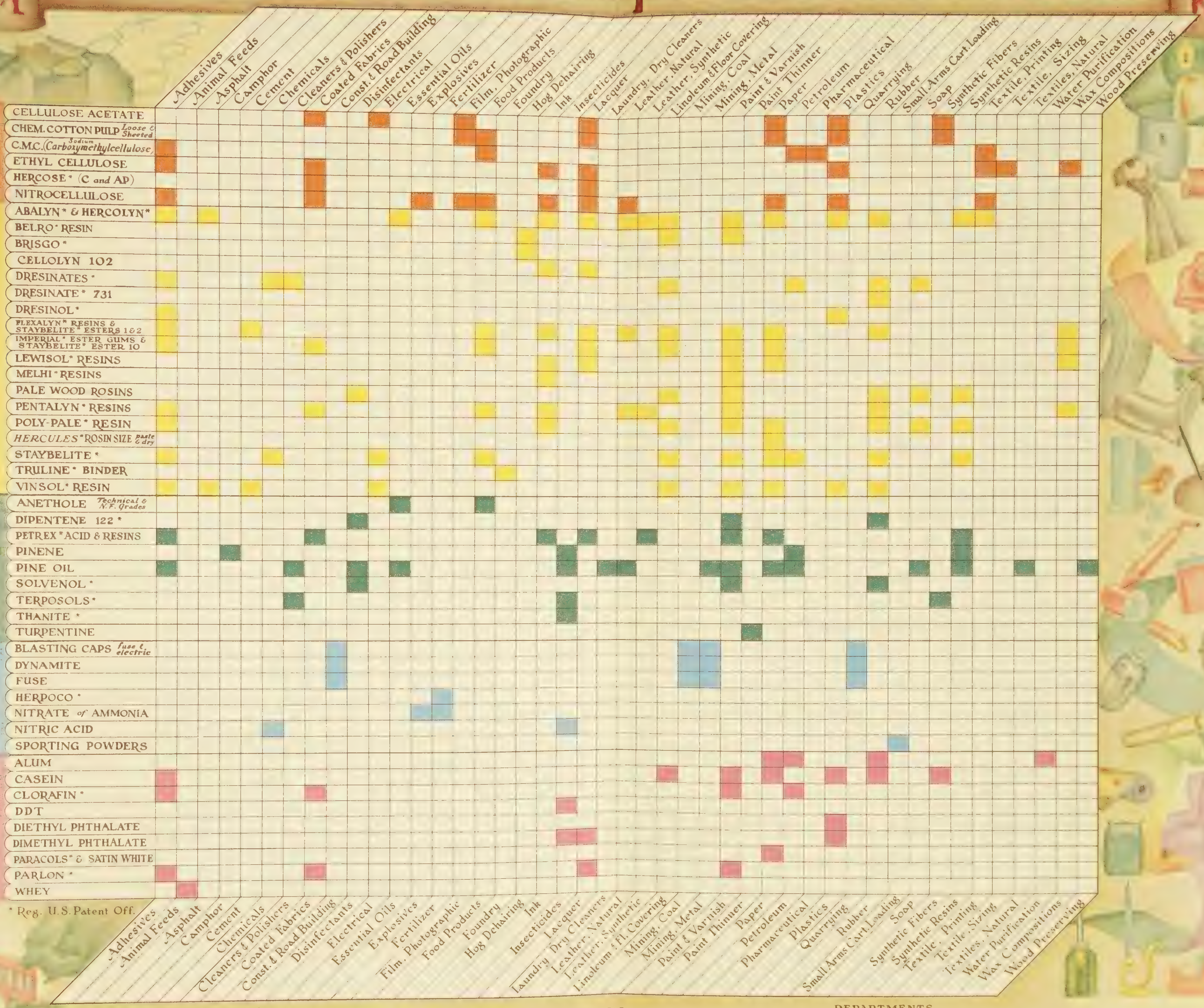
Sources & Uses of Principal Hercules Products



HERCULES PRODUCTS		Adhesives	Animal Feeds	Asphalt	Camphor	Cement	Chemicals	Cleaners & Polishers	Coated Fabrics	Const. & Road Building	Disinfectants	Electrical	Essential Oils	Explosives	Fertilizer	Film, Photographic	Food Products	Foundry	Hog Dehairing	Ink	Insecticides	Lacquer	Laundry, Dry Cleaners	Leather, Natural	Leather, Synthetic	Linoleum & Floor Covering	Mining, Coal	Mining, Metal	Paint & Varnish	Paint Thinner	Paper	Petroleum	Pharmaceutical	Plastics	Quarrying	Rubber	Small Arms Cart. Loading	Soap	Synthetic Fibers	Synthetic Resins	Textile, Printing	Textile, Sizing	Textiles, Natural	Water Purification	Wax Compositions	Wood Preserving
derived from CELLULOSE	CELLULOSE ACETATE								■			■				■						■									■			■					■							
	CHEM. COTTON PULP *Loose & Sheeted*															■	■					■									■			■					■							
	C.M.C. (*Sodium* Carboxymethylcellulose)	■															■															■	■								■					
	ETHYL CELLULOSE	■							■											■		■												■							■	■			■	
	HERCOSE* (C and AP)								■													■																								
	NITROCELLULOSE	■							■					■		■	■			■		■		■								■			■							■					
derived from ROSIN	ABALYN* & HERCOLYN*	■		■									■				■			■		■		■	■	■			■		■			■		■				■	■					
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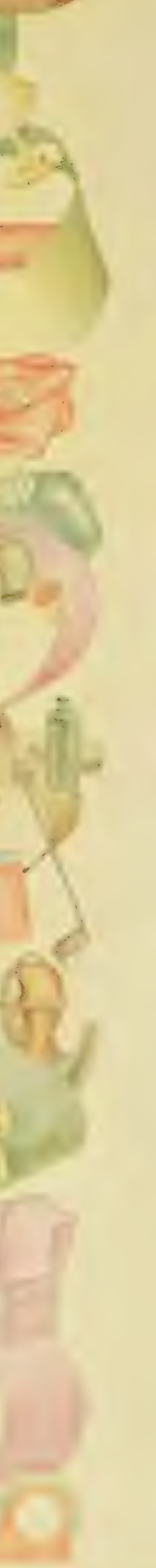
* Reg. U.S. Patent Off.



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ATED TALLOW ❧ FOAM
ILLER ❧ SATIN WHITE
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R.PAS SEREL

CHARL.E
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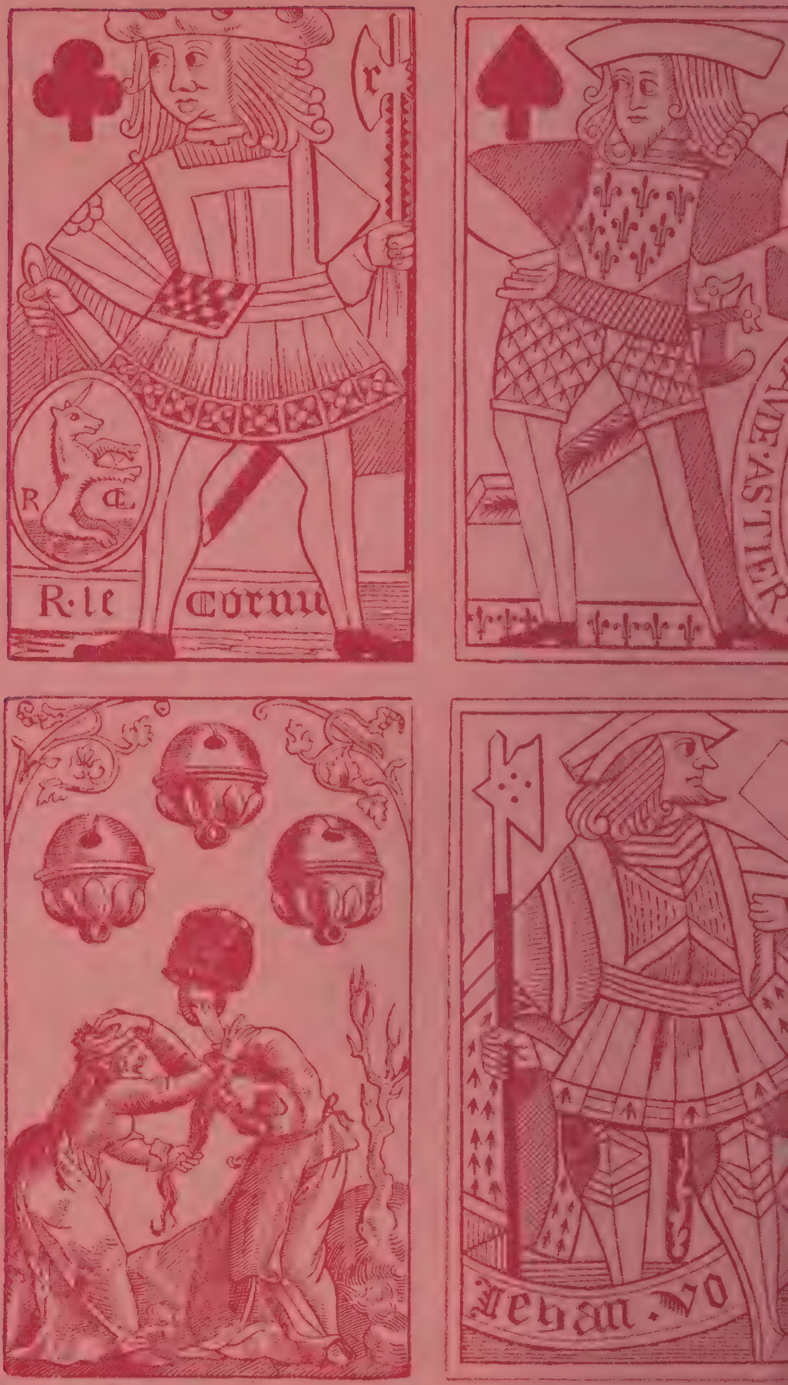

Sixteenth century French and German playing cards, printed from woodcuts.

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1947

The Papermaker Looks at WOODCUTS *and* WOOD ENGRAVING

By WILLIAM BOND WHEELWRIGHT

WHEN PAPER was invented in A.D. 105, i started a chain reaction by providing the ost satisfactory medium for writing or drawing d the only practical material for the long latent t of printing. Papyrus, which bequeathed its me to paper, had served the Egyptians in picture iting for at least 4,000 years before Christ thout even suggesting to them the possibility of nting from type, although they did print from od blocks in the Chinese manner during the rteenth century.

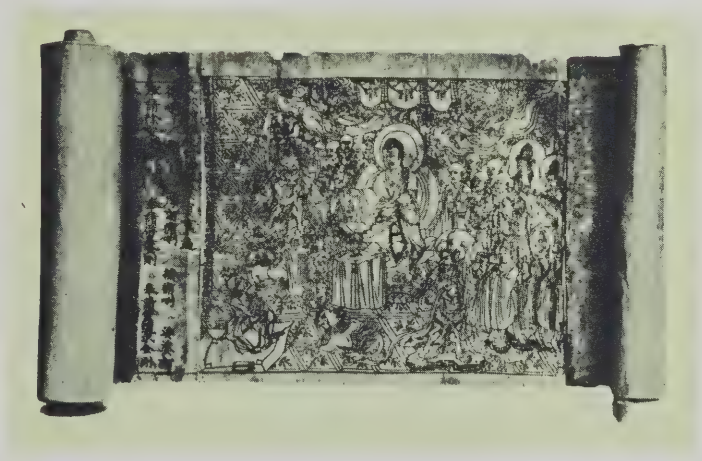
It cannot be stated exactly how long after the ention of paper it occurred to a Chinese to periment with printing on paper from wood cks. The first datable woodcut is the frontis- ce of the Diamond Sutra, which bears the cription: “Printed May 11, 868, by Wang eh, for free general distribution, that the mory of his parents be reverently perpetuated.”[1] he text also was cut in Chinese characters on od blocks. The whole book consists of a roll of er sixteen feet long and a foot wide and was de by pasting the seven printed sheets together. as, fortunately, discovered in 1907 by Sir Aurel n, in the cave temples of Tun-huang, and is served in the British Museum.

early one hundred years earlier, the first extant nples of printing on paper were made. In A.D. by order of the Empress Shotoku of Japan, illion prayers were printed.[2] But there is no of that the printing block was of wood. “Unless original block actually used in the dhāranī ting—be it stone, wood, metal, or porcelain— iscovered in some hidden corner of Japan, na, or Korea, the production of the parent of ext printing must remain a mystery.”[2]

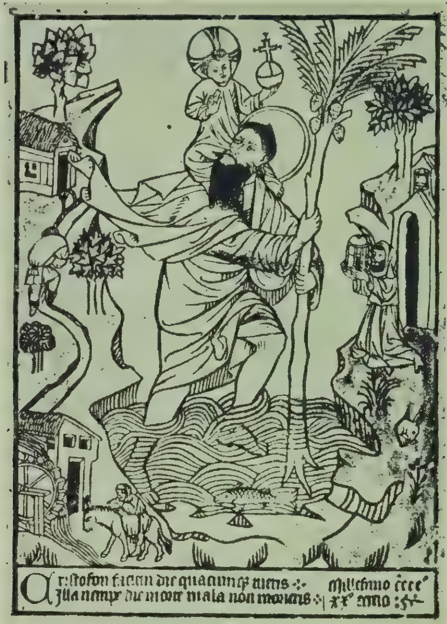
bout this very time the knowledge of paper- ing was beginning to spread toward Europe, result of the defeat of the Chinese invaders at rkand in the year 751. Sometime in the early r of the twelfth century, papermaking got its hold in Spain and began to spread throughout pe.

in the Orient, paper was first made for writing , and, because literacy was confined to the there was no immediate demand for any method of reproduction whereby copies might ore cheaply made. As Otto W. Fuhrmann pointed out, “manuscript books were out of reach, nor did the common man, lacking learning, require more than a visual stimulus by way of a picture. The Saints of the Church, and more often the horrors of Hell (so vividly painted by zealous servants of the Lord) became objects of contemplation in the form of crude block prints; such prints are not much older than the latter part of the fourteenth century.”[3]

The art of woodcuts in Europe appears, nevertheless, to have had a secular origin. The game of cards had come from the East into Italy, Germany, France, and Spain. At first the cards were hand painted, but between 1350 and 1360 they

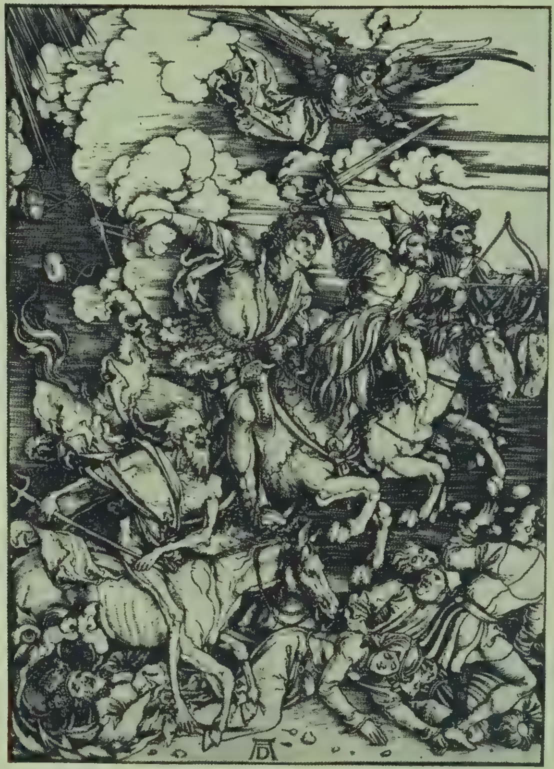


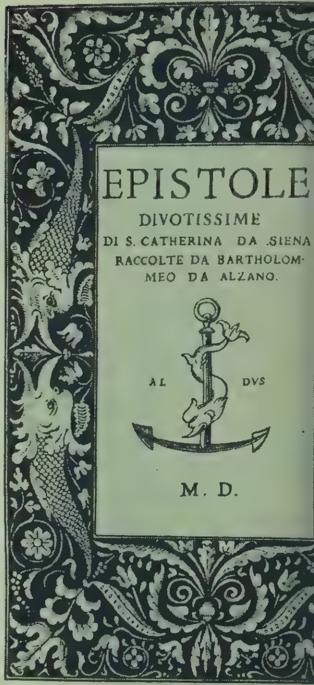
Frontispiece from *The Diamond Sutra:* Printed A. D. 868 in China, this is the earliest datable woodcut.



The Burnheim St. Christopher, a woodcut of 1483.

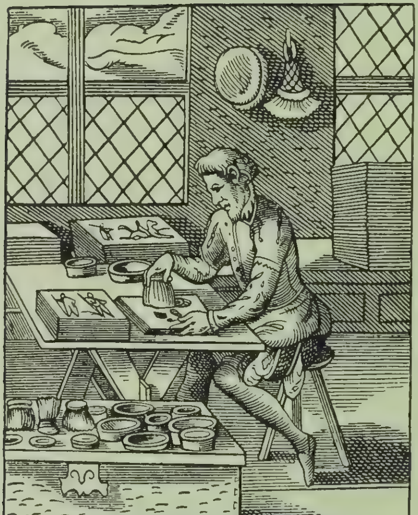
The Riders on the Four Horses, by Albrecht Durer, 1498, from *The Apocalypse.*

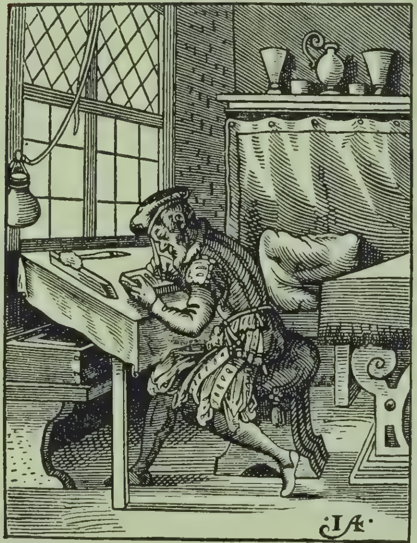




EPISTOLE
DIVOTISSIME
DI S. CATHERINA DA SIENA
RACCOLTE DA BARTHOLOM-
MEO DA ALZANO.
AL DVS
M. D.

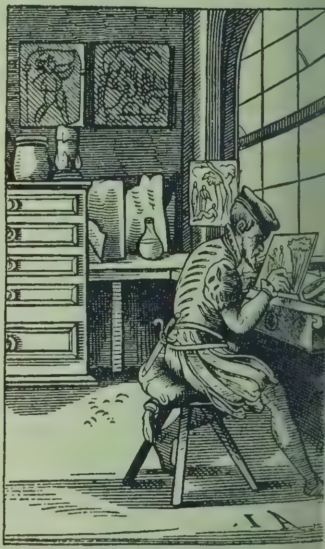
Title page from a book prin
by Aldus in 1500.





Three woodcuts by Jost Ammon, from The Book of Trades, 1568.

1. The Designer.
2. The Wood Engraver.
3. The Illuminator.



gan to be printed in Germany from wood blocks. t textile prints, also made from wooden pat-tns, were used in Egypt as early as the sixth ctury and block printed in Europe during the telfth century.

The earliest prints, both in the Orient and Ccident, were made without the aid of a printing pss. In the Orient where the paper was soft and aorbent, and the ink liquid, the inked blocks we covered with the sheet of paper and the ipression was taken off by rubbing the back of t sheet with a ball of fiber or of cloth.

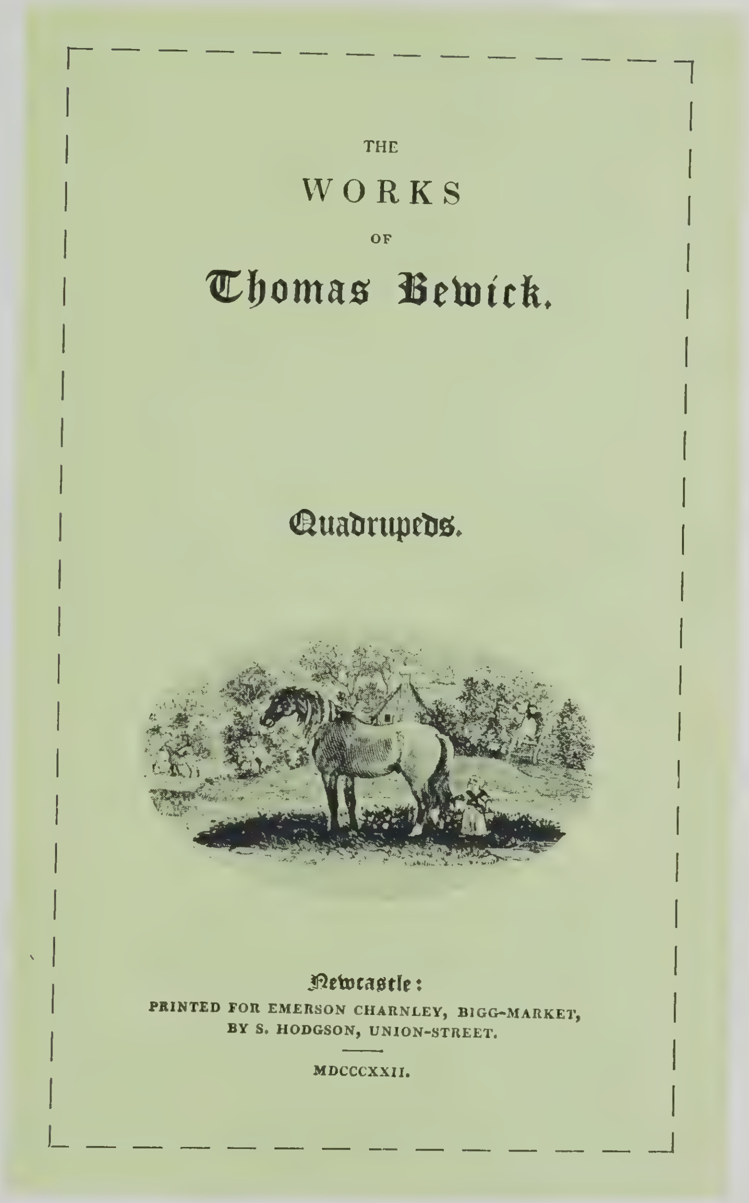
n account of the harder substance of paper mde in Europe, a different technique was neces-say. According to Arthur M. Hind,[4] the block v laid face downward on the paper and ham-ned, often with a mottled result. Such prints, e says, show indentations in the paper and rgular "marks of polish" on the back of the print. t was usual for the designer or artist to draw h subject directly on the surface of the block, n a skilled wood engraver cut away the parts vh h were to appear white in the print. The ung was done on the plank; that is, on the side f ood blocks sawed with the grain.

his type of block, cut with the grain, using a ni as the tool, is properly known as a woodcut. Vd engraving is a much later art which may be ai to have begun with an Englishman, Thomas eick (1753-1828), who developed it to a degree hh has hardly been surpassed. The blocks are o sections of some close-grained wood, such as ox The tools "are solid pieces of steel of various ids and cross sections which are pushed through e ood, leaving a trough, which, when printed, pars as a white line in the design."[5] Hence it is a wood engravings, or "the white line" method, e apable of far greater refinement and possess ch wider range of color value than woodcuts "lack line."

e first books illustrated by woodcuts, after e vention of printing from movable types, were bshed by Albrecht Pfister of Bamberg, in 1461. e 1470 the use of book illustrations became qent, and their popularity seems to have sed with the years. The credit must go, t o the woodcut, which still stands in closer ny to typography than the more versatile lelicate wood engraving, which, when it ed its maximum in fine detail, was actually sible for the adaptation of coating to book e in the year 1875.

Theodore Low DeVinne, the famous New York printer, had been engaged to produce a very fine catalog with wood engravings printed in color. "It is important," he told his paper man, "that the colors retain their brilliancy. To attain that I must print on white coated paper, but the paper must be coated on both sides on a lightweight paper."[6]

The problem was put up to Charles M. Gage who was connected with a factory making coated-one-side, glazed paper. He succeeded in filling the



THE
WORKS
OF
Thomas Bewick.

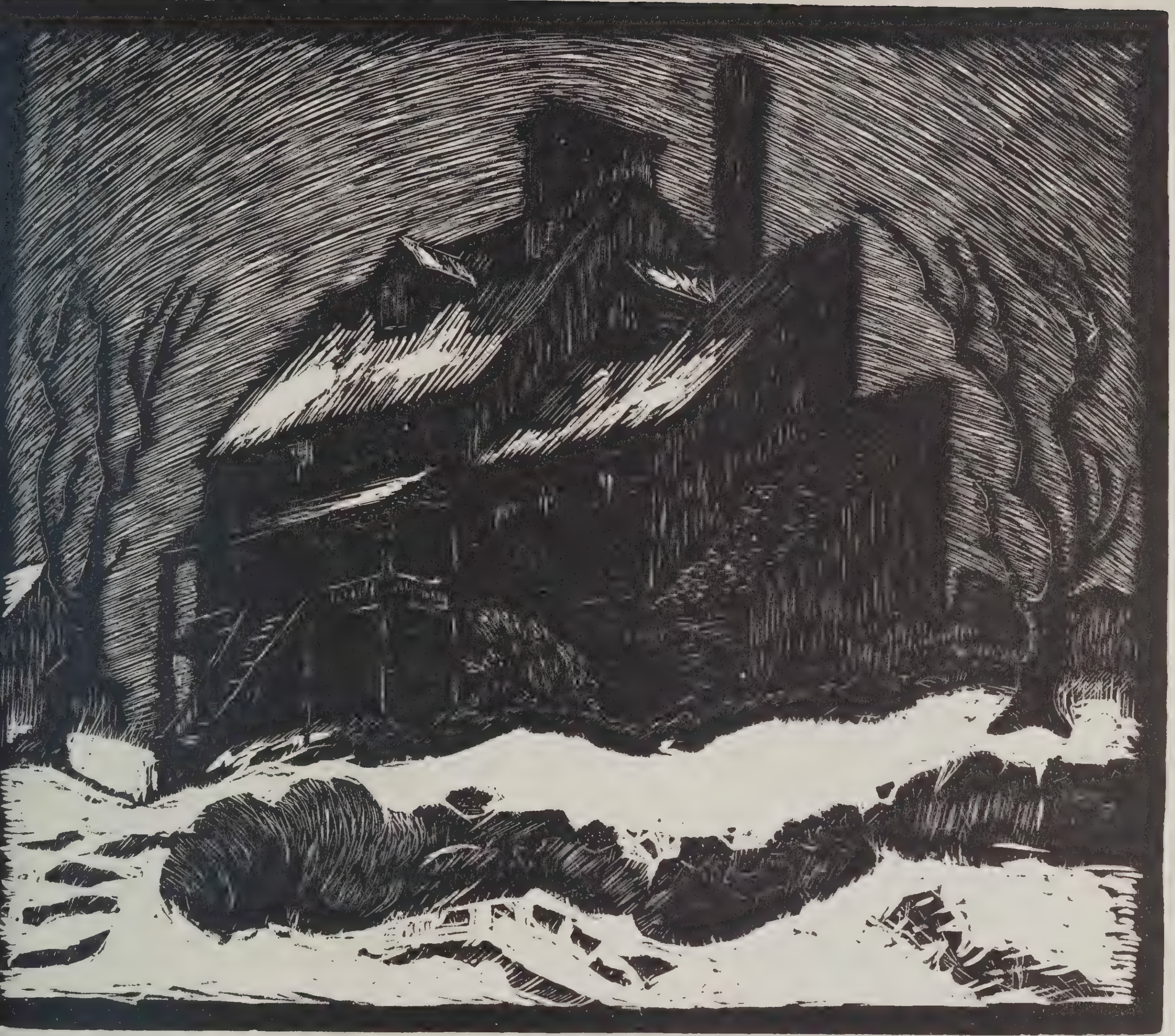
Quadrupeds.

Newcastle:
PRINTED FOR EMERSON CHARNLEY, BIGG-MARKET,
BY S. HODGSON, UNION-STREET.

MDCCCXXII.

Title page from *Quadrupeds* by Thomas Bewick, with wood engraving by the author, 1822.

THE PAPER MAKER was one of a group of five Hercules publications which won a first-place award from the National Industrial Advertisers' Association in June. This same group of publications was also awarded the Direct Mail Advertising Association's plaque for "the most effective use of good showmanship in an industrial direct mail advertising campaign," in its direct mail and sales production literature.



Winter

Extra prints of this wood engraving, suitable for framing, will be sent to you upon request.

THE GRAVER

Woodcuts and Wood Engravings

A CHRONOLOGY

By Harry E. Weston

"ENGRAVING IS, IN BRIEF TERMS, THE ART OF SCRATCH"—JOHN RUSKIN

18 The *Virgin in a Rose Garden* is the oject of the earliest European woodcut bearing late to have been found. This cut, dated 1418, n the Royal Library at Brussels.

* * *

23 A print of a woodcut representing St. ristopher, bearing the date 1423, is the best own of all the early European single woodcuts. was found about the middle of the eighteenth ntury in the library of a convent in Buxheim, rmany, about fifty miles from Augsburg. The nt was pasted inside a cover of a Latin manuipt, *Laus Virginis*, the cover being oak covered h undressed deer skin.

he print pictures St. Christopher, a famous endary character of the Middle Ages, fording a eam with the infant Jesus on his shoulders. St. ristopher, using a palm tree as a staff, and sping it rather tightly in both hands, with the t-end in the water, is bearing his load toward right bank of the stream upon which is the of a hermit. Between the cell and the edge of stream, the hermit, apparently kneeling, holds ntern to guide St. Christopher in his crossing. n the opposite bank is pictured a mill driven an overshot waterwheel. To the rear of the , climbing a steep path to a cottage high above s a miller or peasant loaded down with a bag ng over his right shoulder. In front of the , and quite near the left bank of the stream, is ss and driver. The ass is carrying a load in a placed over its back.

1455 *Speculum Humane Salvationis* (The Mirror of Man's Salvation) is said to be the first book printed from type that had woodcuts. According to Dutch tradition, this book, a small folio containing 58 cuts, was issued about 1455 by Laurent Janszoon Coster of Haarlem. Each cut, bordered with an architectural frame, is divided into two subjects. Most of the subjects are taken from the Old and New Testaments, including the Apocrypha. A few of them illustrate classic history.

1460-61 Albrecht Pfister of Bamberg was the first German printer to use woodcuts in illustrating books printed with movable type. One of the first of these books, possibly the first, *Der ackermann und der tod*, by Johannes von Saaz, although undated, is believed to have been printed in 1460.

Another book, *Der Edelstein*, by Ulrich Boner, was printed by Pfister in 1461. This book, a small folio of 28 leaves, contains 85 fables in rhyme and is illustrated with 101 woodcuts. It is the first printed book in the German language to be dated —"Am Sant Valentinus tag, 1461."

* * *

1467 The first Italian book to be illustrated with woodcuts is the *Meditationes* of Cardinal Turrecremata. Printed by Ulrich Hahn at Rome in 1467, the book contains 34 woodcuts which professedly illustrate the subjects of the frescoes which were at the time on the walls of the Church of San Maria de Minerva in Rome.

1478 The celebrated Cologne Bible was printed about 1478 in Cologne (the reason for ascribing the name to the work) by Heinrich Quentell. Appearing in two editions in both High and Low German, it was illustrated with 125 woodcuts. Most of the illustrations, 94 of them, relate to the Old Testament; the remaining 31 to the New. Of the 94 Old Testament illustrations, 33 treat of the life of Moses.

* * *

1480 Woodcut illustrations first appeared in an English printed book in or about 1480. Printed by William Caxton, the first English printer, the book, the *Mirrour of the World*, made use of two series of cuts. Diagrams make up one series; while sketches depicting masters instructing their scholars or at work alone make up the other.

1480 Alfonso del Puerto and Bartolomé Segura produced the first illustrated book to be printed on the Iberian Peninsula. It was an edition of *Fasciculus temporum*, and was printed at Seville in 1480.

* * *

1482 An edition of Ptolemy's *Cosmographia*, printed by Leonard Holl at Ulm in 1482, contains the first woodcut maps to appear in a printed volume. There are 27 of them, one being a general map of the world. Each map occupies a spread of two pages.

1486 One of the most important illustrated books of the fifteenth century is the *Sanctae peregrinationes* of Bernard de Breydenbach, a canon of the cathedral of Mentz. Printed in Latin by Erhard Reuwick in Mentz in 1486, the book covers a pilgrimage of Breydenbach to the Holy Land. This volume, printed in folio, contains a number of woodcut illustrations, among which is a picture of Venice, which is five feet long and ten inches high. There also are views of Corfu, Modon in Southern Greece, and of the country in the vicinity of Jerusalem. Many pictures of animals such as a camel, a giraffe, a salamander, and unicorn, likewise, are included.

* * *

1487 The *Obsequiale*, printed by Erhard Ratdolt in Augsburg in 1487, makes use of the first regular woodcut portrait to be printed in colors. This woodcut pictures Bishop Friederich von Hohenzollern, who had prevailed upon Ratdolt to return to Germany from Italy and to set up a press in Augsburg. The printing was done in black and two or three colors.

* * *

1493 Anton Koberger, a printer of Nuremberg, published the *Weltchronik* of Hartmann Schedel in 1493. This work, commonly referred to as the *Nuremberg Chronicle*, was printed in both Latin and German editions. The German edition was illustrated with 645 separate woodcuts, some of them being repeated several times to represent different subjects.

Among the woodcut delineations is a two-page sketch picturing the city of Nuremberg. In the lower right corner of the illustration is a small sketch of the Ulman Stromer paper mill, the first paper mill in Germany (established in Nuremberg about 1390). This sketch is the first illustration of a paper mill to appear in a European book.

Designs of the woodcuts illustrated in the work are attributed to Michel Wohlgemut and Wilhelm Pleydenwurff. Various artisans, however, apparently cut them.

* * *

1498 Fifteen large illustrations from woodcut designs of Albrecht Dürer, relating to the Apocalypse of St. John and with the text set in types of Anton Koberger, were printed in Nuremberg in 1498. Printed in German and Latin editions, this series of designs constitute the best-known work of the artist. However, numerous other designs, which, in the aggregate, represent nearly all aspects of German life in the early sixteenth century, are attributed to him.

499 The outstanding Italian woodcut illustra-
ns of the fifteenth century appear in the
ypnerotomachia Poliphili (*Dream of Poliphilo*),
ich was printed in Venice, by Aldus, in 1499.
is series of cuts, attributed to many different
ists and totaling 192 subjects, relate to mythol-
y, ancient history, emblematic figures, pictures
processions, architectural and ornamental
signs, and statues and vases.

* * *

30 The *Herbarum Vivae Eicones* of Brunfels,
nted in 1530, is noted as the first printed work
contain botanical diagrams truly representative
the plants illustrated. The book contains 288
grams, most of which are full-page reproduc-
ns. So accurate are they as to detail that even
presence of torn and dead leaves is revealed.
ns Weiditz was the designer of the woodcuts.

* * *

38 The *Dance of Death*, well-known series of
eenth century woodcut illustrations, was pub-
ed in first edition at Lyons in 1538. Each of
41 illustrations making up the series depicts the
mph of death over some individual who may
ify a class or group, such as a peddler, miser,
st, judge, drunkard, or trader. The drawings
e made by Hans Holbein; the cuts, it is
eved, by Hans Lützelburger.

nother great work of Holbein is his *Figures of*
Bible. Appearing contemporaneously with his
ce of Death at Lyons in 1538, it is made up of a
es of 92 illustrations of the Old Testament.

* * *

42 In a most outstanding book, an herbal, by
hsius, famous German botanist of the six-
th century, appears the first portrait of a
dcut engraver. The portrait appears on the
page of the book along with a group portrait
vo artists. One of the artists is shown at work
ving a plant in a vase before him; the second
pying a drawing on to a wood block. The
aver is not at work.

he book contains 500 illustrations.

1543 The first use of woodcut illustrations as an aid in scientific writing appears in a treatise on anatomy, by Vesalius. This book was published at Bâsle in 1543. The illustrations were designed by Jean Calcar.

* * *

1549 The entry of Henry II into Paris is illustrated in a woodcut designed by Jean Cousin, an outstanding French woodcut artist. This illustration was published in 1549. The following year, publication was made of another illustration by the same artist, showing the entry of Henry II into Rouen.

* * *

1568 *Eygentliche Beschreibung Aller Stände auf Erden, hoher und nidriger, geistlicher und weltlicher, aller Künsten, Handwercken und Händeln*, published in Frankfort-on-Main in 1568, contains the first sketch of a papermaker at work to appear in a European book. The illustration shows a vatman forming a sheet of paper. It also shows a press and stamper and a small boy carrying sheets of finished paper.

This woodcut illustration, the eighteenth in the book, is only one of 115. Each woodcut pictures a trade or calling.

Following each sketch is a verse about the particular trade or craft. All cuts were depicted by Jost Amman; all verses, written by Hans Sachs.

A later edition of this book of trades was published in 1574. This edition was printed in Latin. It contains 132 illustrations.

* * *

1766 Jean Michael Papillon, a third-generation member of a French family of wood engravers, published a monumental work (two volumes and a supplement) on wood engraving in 1766. This work is entitled *Traite Historique et Pratique de la Gravure en Bois.*

Born in the year 1698, Papillon began to engrave on wood blocks when only nine years old. When only eight years old, he did his first writing on the subject.

1784 *Select Fables* is the first book of importance to be illustrated by Thomas Bewick, commonly credited as the founder of white line engraving* as contrasted with the older procedure of producing woodcuts. This work was published in 1784 by Saint of Newcastle.

The first edition of *British Quadrupeds*, a book for which Bewick is most noted, was published in 1790.

Another work for which he is famous is *British Birds*. This work appeared in two volumes—the first edition of the first volume in 1797; and of the second, in 1804.

Bewick is believed to have been the first to have introduced boxwood into the art and likewise to have made his drawings on the butt-ends of blocks rather than on the plank-sides.

◆

1794 The beginning of wood engraving in the United States dates back to 1794, when Alexander Anderson, a young man of nineteen, having experimented for a year on wood, copied illustrations from *The Looking-Glass for the Mind* for William Durell, a New York publisher. The first third of the work was done on metal; the remainder, on wood.

A new edition of the book was brought out in 1800 by Longworth. This edition was illustrated only with wood engravings.

Anderson had learned of Bewick's work and of his use of boxwood. Also, he had learned of Bewick's method from a study of some of his engravings.

Anderson, licensed to practice medicine in 1795, was granted his Doctor of Medicine diploma the following year. After practicing for several years, and following the passing of several members of his immediate family with yellow fever, he gave up medicine and devoted the rest of his life to the work of an engraver.

1810 The art of wood engraving was introduce to Philadelphia in 1810 by William Mason, native of Connecticut.

1811 Wood engraving is said to have bee brought to Boston in 1811 by Nathaniel Dearborn, a stationer and printer, and an engraver o copper, who had a location on School Street.

◆

1823 The first illustrated paper in the Unitec States probably was the *New York Mirror* Started in July, 1823, the paper at the close of the fifth volume (July 5, 1828) according to W. J. Linton in his *The History of Wood Engraving in America*, contained the following statement "Engravings shall be continued as heretofore." Linton does not state when wood engravings were first used by the *New York Mirror*, but the quoted statement indicates that they were used previous to 1828.

1841-43 Joseph Alexander Adams of New York, in 1841, made electrotypes of wood engravings. These electrotypes, believed to represent the first practical application of the art to printing, were made by depositing copper directly on the wood engravings. Invariably the engravings were destroyed in the process; but the electrotypes had the advantage of greater life.

Mr. Adams also is noted for his work in producing the wood engravings to illustrate Harper's *Illuminated Bible*. First published in 1843, this Bible, considered for years as America's best-illustrated Bible, utilized 1600 historical engravings credited to Adams. The design of 400 of these engravings was the work of J. G. Chapman.

◆

1847 J. W. Wilcox of Boston, Massachusetts, is credited with introducing wax molding as a means of producing electrotypes from wood engravings. This process permitted electrotypes to be made of wood engravings without injuring the

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*The art as introduced by Bewick, usually designated as white-line engraving, may be likened to a "drawing upon a blackboard with white chalk as compared to a drawing with a pen upon paper. Or it can be thought of as a photographic negative as opposed to a print therefrom." (Preceding quotation from *A History of Wood Engraving*, Bliss, Douglas Percy.)

ginals. Specimens of his work were shown in
47 in an exhibition of the Massachusetts
aritable Mechanic Association.

* * *

57 In a paper by J. Contencin, read at the
eting of the South London Photographic Society
February 21, 1861, it was related that the
thor had successfully applied photography to
od engraving as early as April, 1857. Through
use of this method of subject transfer to a
od block rather than by sketching or drawing,
surface of the block to be engraved is sensitized
receives the print from a photographic
ative.

60 Charles Wells is credited with devising a
thod for joining together pieces of boxwood to
mit the production of wood engravings of
e size. Introduced in 1860, the method con-
ed of drilling holes at the back and sides of the
aller blocks and bolting the pieces together.

MISCELLANEOUS

Woodcuts are made upon soft wood cut plank-
with a knife pulled or drawn towards the
. On the other hand, wood engravings are
le upon the end-grain of box, a very hard
d, by the action of the graver or burin, which
ushed by hand away from the worker. The
d is always fairly close-grained and the
ace of the blocks is smoothed very carefully.
e woodcuts and wood engravings have to a
great extent been used in book decoration
have had therefore to be printed with types,
blocks are made of the regulation height of
; that is about seven-eighths of an inch."
History of Wood Engraving, Bliss, Douglas
y (1928).

* * *

Mistakes (in woodcuts) could be remedied and
ations made at later times by boring a hole
e block and driving in a plug of fresh wood shaped like a wedge, so that it grips the sides of the hole very tightly. The block is then levelled down and smoothed at that place and the cutting can be done again. This practice has left amusing traces. In the edition of *Josephus* published by Verard (Paris, 1490), we see a knight wearing a bishop's mitre. In the *Froissart* from the same press three years later the block has been plugged, and the knight now wears a royal crown; but the tell-tale pendants from his old headgear still hang over his shoulders." *A History of Wood Engraving*, Bliss, Douglas Percy (1928).

* * *

"In engraving on wood by lamplight, a most excellent method is to place between the work and the lamp a glass globe filled with clear water, in such a manner that the concentrated rays of light may fall upon the block. This has the advantage of giving a much more brilliant light than the lamp itself, and at the same time is much cooler, as the lamp is at a greater distance. It is also much more economical, as a single lamp will serve several persons each using a globe. We have seen in France four persons working very comfortably with one candle in the midst of them; but in England we do not study economy so much, nor is it so well understood as amongst the nations of the continent. We remember also to have seen in France a letter engraver make use of clear blue water, or rather weak *aquafortis* strongly impregnated with copper, in his globe, the light through which, he said, was much more agreeable, clear water being too dazzling." *The Art of Engraving*, Fielding, T. H. (1841).

* * *

"Papillon (John Michael) mentions box, pear-tree, apple-tree, and the wood of the service-tree, as the best for the purpose of engraving: box was generally used for the smaller and finer cuts intended for the illustration or ornaments of books; the larger cuts, in which delicacy was not required, were mostly engraved on pear-tree wood. Apple-tree wood was principally used by the wood engravers of Normandy. Next to box, Papillon prefers the wood of the service-tree." *Treatise on Wood Engraving*, Chatto, William Andrew (1881).

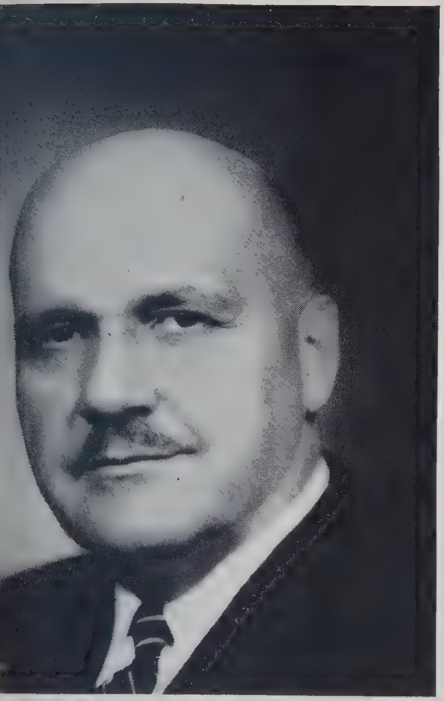
TREES

They rank among Nature's noblest creations.
With feet embedded in earth, they reach heavenward
with a multitude of aspiring fingers.
In its shade, man basks and enjoys its fruits.
Its branches are a haven for the creatures of the sky.
Rooted deep in the elements, it asks nothing of man.
The wind whispers through its leaves, and birds compose
chorals in its verdant foliage.
Its naked form stoically faces winter and seeks no refuge.
Gracefully it bows before the furies when storms rage.
Ringed with age and wrinkled, it stands proudly
erect to the end of its time.
And when hewn by rugged hands, it yields up its life
to be transformed into a host of creations, artistic
and utilitarian, that do honor to its existence.

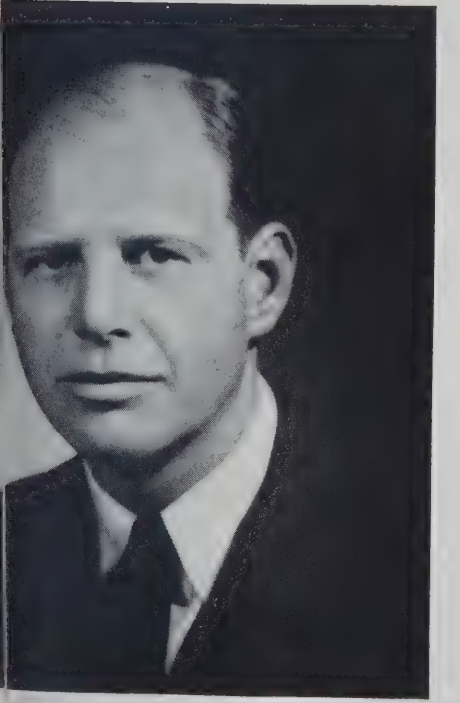
—P. K. THOMAJAN.

HONORS TO THESE MEN

A page of bouquets handed to men who have contributed to the development of the art and practice of papermaking past and present.



TO C. B. CLARK—for his more than 40 years of association with the pulp and papermaking industry of Wisconsin, starting in 1904—upon his graduation from one of New England's oldest and most distinguished universities—with a firm in which his father had been one of four founders, and where over a period of four years he gained a practical knowledge of pulp and papermaking operations; for his successful leadership over a period of years as president of two Badger State papermaking firms—one of these mills (a producer of glassine) having been sold during 1946; the other (of which he retains the presidency) having a daily capacity of 70 tons of bond, ledger, mimeograph and other related grades; for his participation in Association activities of the industry, he at one time having served a term as chairman of the sulphite bond division of the Writing Paper Manufacturers Association and at present serving on its finance committee; for his other business interests which include directorships in two national banks—also vice president of one of them, chairman of the executive committee of the other, and a directorship in the papermaking firm with which he began his career in 1904; for his civic interests, as revealed by the various home-town governmental offices filled by him—one term as alderman, three terms as mayor, one term on school board, and some years as chairman of the Recreation Commission, also by his service at one time as president of the League of Municipalities of Wisconsin; but most of all for his activities in connection with human welfare, education, and the church, which perhaps better than anything else reveal the real character of an individual—he being founder and president of the Theda-Clark Memorial Hospital (Neenah, Wisconsin), trustee and past-president of the Board of Trustees of one of Wisconsin's well-recognized colleges, also serving at one time as president of his college alumni association in Wisconsin, and now serving his church both locally and state-wide in official lay capacities.



TO JOHN L. RIEGEL—for his association since 1918 with a papermaking firm started by his paternal grandfather in 1862, a firm that had its beginning with a one-ton newsprint mill in New Jersey and which today is noted as a manufacturer of a number of specialty papers, particularly glassine, jute manila, tag, pattern paper, drawing, and other similar specialties; a firm operating twelve paper machines, eight in one mill, one in each of two other mills, and two in a fourth mill, and together having a daily productive capacity of 220 tons; for his step-by-step growth with this firm to his present position of president and treasurer, he first having spent three years in the mills learning details of the business, then becoming secretary and director in 1921, treasurer in 1925, treasurer and general manager in 1926, executive vice president and general manager in 1929, president and general manager in 1936, president, treasurer, and general manager in 1942, and continuing in his present position since 1945; for his educational preparation for industrial leadership, he having graduated with a degree in engineering administration from New England's best-known engineering school; for his trade association activities, he having been active in the affairs of the Glassine and Greaseproof Manufacturers Association for a number of years and having served as president of the American Paper and Pulp Association for two terms (1940-41, 1941-42); for his other business connections that include the presidency of a leading textile manufacturing organization; for his numerous club memberships which reveal an interest in tennis, in golf, and in good-fellowship both with college men and with business men; and especially for his genuine interest in other people—approachable, modest, and kind.

• • •

A FEW WORDS ABOUT

WOOD TYPE

While machinery, of a sort, plays an important part in the present-day production of wood type, type was originally cut from wood entirely by hand and its production is, therefore, related to the art of wood engraving.

Until 1828, wood type was made by laying a pattern on end-grain wood, marking thereon the pattern's outlines and then carving clear the white spaces with hand tools.

The original routing machine of 1828 had a stationary cutting tool under which the work was moved. This necessitated a different pattern for each size of type.

William Leavenworth improved this mechanical process by adapting the pantographic principle to the routing machine and using master patterns. This method allows one pattern to serve for a large range of sizes, and little change has been made in the method of cutting wood type from that day to the present time.

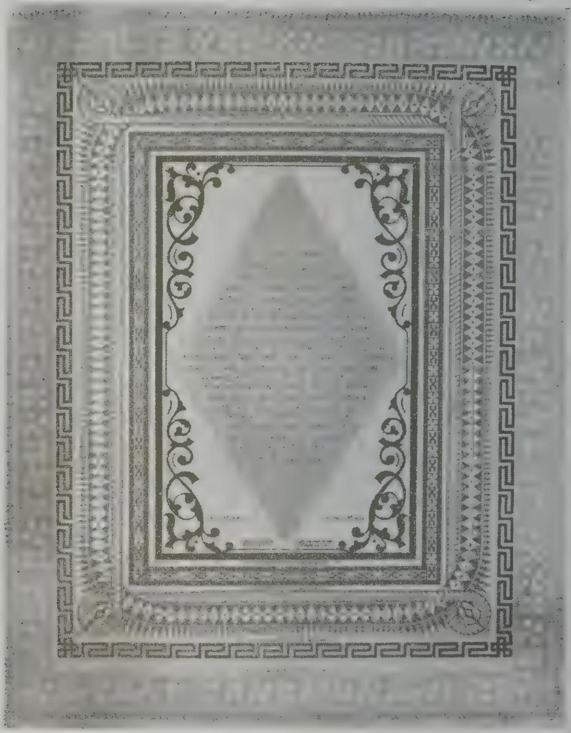
By the pantographic method the prepared wood is secured on the machine, while the pattern is secured at the left of the operator. A pointer is guided by the operator around the edges of the pattern, while the cutters reproduce the pattern in a predetermined size. Hand-finishing with gravers completes the letter.

Boxwood, apple, dogwood, hard maple, or other woods with close grains have been used for wood type.

Present-day wood type is made of endwood slabs of maple which is cured for more than a year, then sanded, and varnished with several coats, each of which is hand-rubbed with oil and pumice.

For this information, for the specimens of wood type and borders from the William H. Page & Company catalogue, and for the photographs on the opposite page, we are indebted to the Hamilton Manufacturing Company at Two Rivers, Wisconsin.

On both sides of this insert are specimens of wood type reproduced from the catalogue of the William H. Page & Company, *circa* 1874.



To Color Printers

We have the pleasure of laying before you a Specimen Book of Chromatic Wood Type, and would say it is now eighteen years since we began Type making. Progress in the Art can be seen by comparing the present volume, with Specimens of that date. There were at that time five or six other manufacturers in the country. Now we manufacture seven-eights of all the Wood Type made, and are now able to show by itself a Book of Chromatic Type and Borders that is not excelled in the world. It has taken years of time to prepare and perfect it. The designs with two or three exceptions are entirely original with us. The demand for Chromatic Type is quite limited, therefore we cannot supply this book free, only to our Agents.

Most Respectfully Yours,
Wm. H. Page & Co.

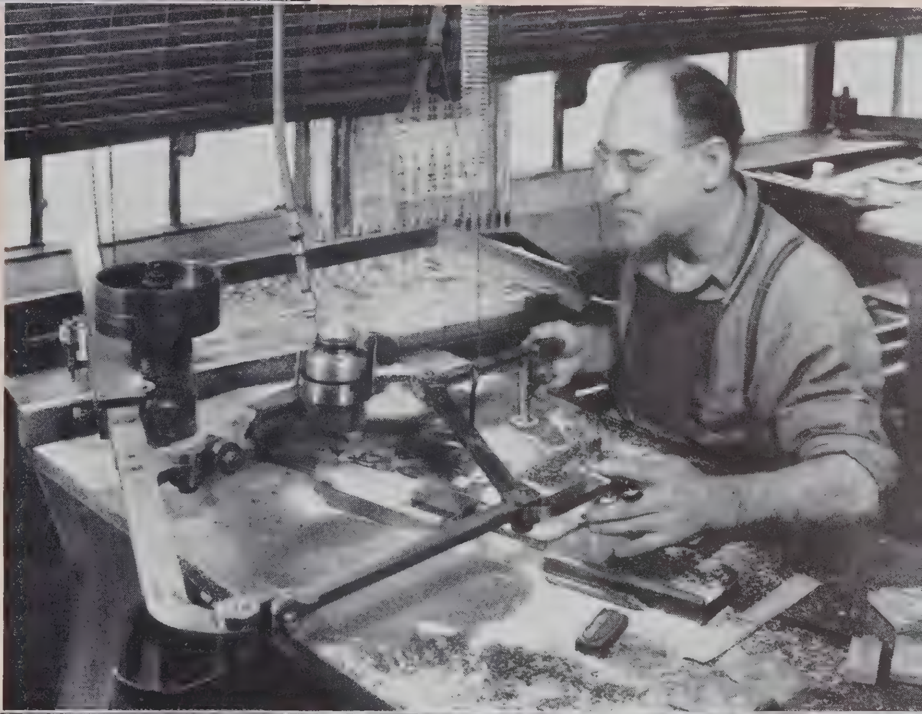
HUE

Left: The slabs of maple endwood from which wood type is cut today are sawed from logs harvested before the sap begins to run, so that the wood is clear.

Below: The modern pantograph router cuts wood type from a master pattern. The operator's left hand holds the portion of the machine operating on the pattern, the support in his right hand regulates the depth of the cut.

v: The wood type is finished by an
n known as a "trimmer." The
y of the finished product depends
his skill, obtained only after years
actice.

right: The finished wood type is
ged in wooden galleys prior to
ping in secure packages for shipment
nting establishments.



PAPER, COPPER, and EXPLOSIVES

by Carl H. Pihl*

DECORATIONS BY BRONSON B. TUFTS, JR.

APERMAKING begins when a tree is cut down and reduced to small chips by various me- ianical operations, after which the chips are aced in digesters, or huge cooking vessels, here the gums and resins are removed. In the gesters used for producing sulphite pulp, bronze i widely specified for pump parts, liquor lines id fittings, relief lines and valves, because this urdy alloy of copper can effectively withstand ie corrosive attack of the acid solution, or liquor, i which the wood chips are cooked. The average gester may contain as much as three tons of lonze, an alloy of copper and tin.

When the pulp emerges from the digester it i washed, screened for impurities, and bleached. asher linings, screens, and screen frames are cten made of brass, an alloy of copper and ic. After bleaching, the pulp is thickened ad conveyed to the beating machine where te fibers are frayed c fibrillated, hydrated, ad thoroughly mixed. Szing and coloring aents are also added i the beater, in which te fly bars are made of sicon bronze or phosor bronze. These hgh-strength copper aoys withstand the svere abrasive conditions encountered in this operation. Beater linings and hoods are generally made of copper or brass sheet.

WOOD FOR PAPER

From the beating machine the stock, as the pulp is now called, goes to the Jordan engine, or machine, where it is further refined. This is accomplished by a rapidly rotating filler plug within the conical-shaped Jordan engine. Both the filler plug and the stationary cone contain knives or blades made of silicon bronze or phosphor bronze. These blades slice the tiny fibers into yet smaller bits and must be hard enough to retain a good cutting edge and have a high resistance to impact as well as to corrosion.

Great quantities of water are added to the stock in the flow box, which has several vital parts of copper and bronze, until it contains about 99 percent water and has the consistency of milk. Now the stock is fed onto the huge endless-belt screen of the gigantic papermaking machine, the Fourdrinier, where it is shaken and agitated, causing the fibers to interweave and overlap. Much of the water drains through the screen while suction boxes, containing a great deal of brass, draw off an additional amount. The screen wire is almost universally made of phosphor bronze which has proved most efficient and satisfactory due to its high resistance to the wear resulting from friction, abrasion, and fatigue involved in this operation. Silicon bronze or brass is also used for Fourdrinier screen wire.

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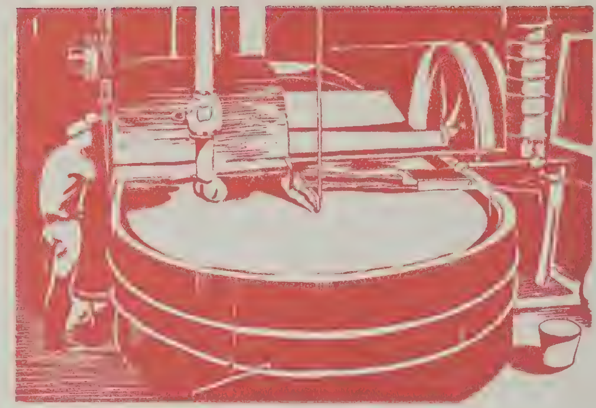
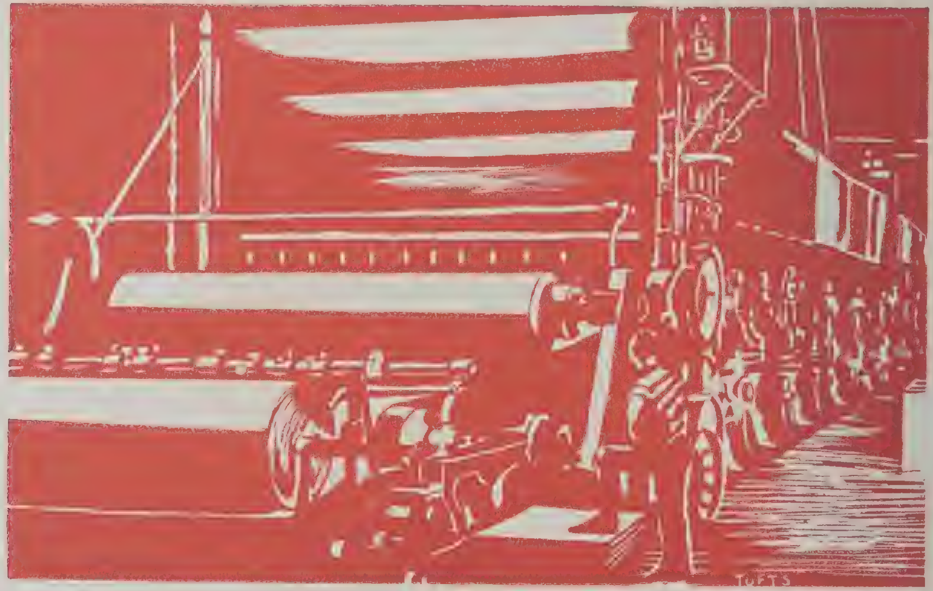
*opper & Brass Research Association, New York.


PAPER • THE BEATER

Passing over and under several rolls, the stock loses most of the remaining water which is eliminated by suction, pressure, and evaporation. It is here—on the wet end of the paper machine—that paper is born as the roll is able to support its own weight without breaking, although only seconds before it was a liquid. It is here on the wet end of the Fourdrinier that copper and its alloys find their most extensive use because, being rustproof and corrosion-resistant, they assure the cleanliness of the finished paper. The dandy roll which imparts the watermarks, if any, to paper nearly always made brass, as are the tab felt and return w rolls. The couch a breast rolls are usua made of cast silic bronze, while the be ings and bushings the Fourdrinier are a special bronze.

In pulp and paper mills, very large quantiti of copper and its alloys are used for the extensi piping and fittings, pump parts, valves, and wel ing rods. Copper, of course, is essential for t vital electrical installation and includes bus ba conduits, wire, switches, terminals, and oth equipment. In addition, there are countless m cellaneous items, such as screws, nails, hing clamps, cocks, gaskets, and chain.

All of this adds up to a considerable utili tion of the red metal. It is estimated that t paper mills of this country consume appro mately 29,000,000 pounds of copper and its loys in the average peacetime year, or sligh



PAPER • DRY END OF THE FOURDRINIER

BLAST IN A QUARRY

r one pound of copper for each ton of paper duced.

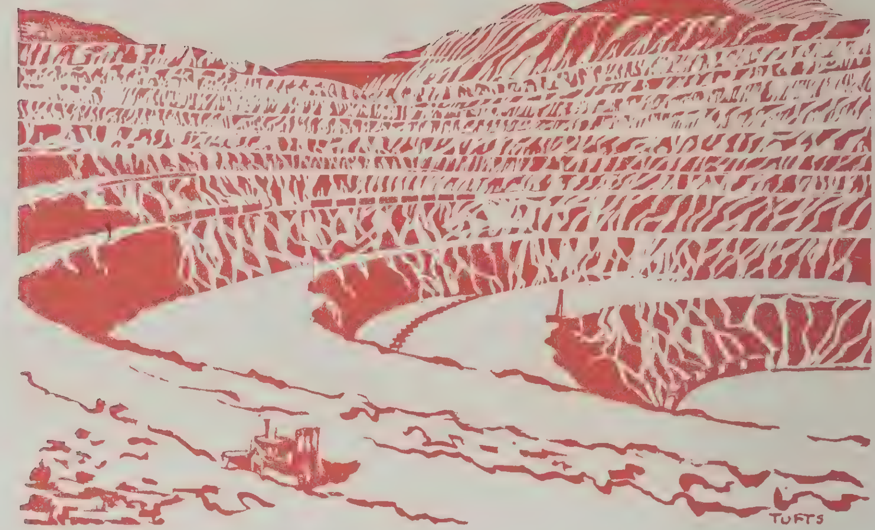
The Importance of Paper

s hardly necessary to elaborate on the vital ortance of paper to our modern life, in peace n war. The basic tenets of our liberty and edom—the Declaration of Independence and Constitution of the United States—were both tten on paper. Without paper there would be ooks, magazines, or newspapers; government business would be crippled, and life would ome a nightmare. It is estimated that this ntry consumes 20 ion tons of paper a r, or almost 300 nds per capita.

ist like every other ustry and business, copper industry is endent upon paper thousands of important uses. Copper d not be mined efently without paper r drawings, blueits, maps, orders, and correspondence. The copper and brass mill fabricators could not efficiently produce the wide range of copper alloys in all the required shapes and forms without paper for factory and laboratory control forms, packaging and labeling, and for routine business functions. The industry also utilizes a large quantity of paper for the production of technical and promotional literature, manuals, and brochures.

UNDERGROUND COPPER MINE

Records attribute the invention of paper to Ts'ai Lun, Chinese philosopher, teacher, and statesman, in the year A.D. 105, who produced papers from vegetable fibers, mulberry bark, and hemp. A few years later, there was produced in China a pure rag paper. The art of papermaking, a secret zealously guarded by the Chinese for 600 years, was acquired by Arab invaders and brought to Samarkand in the eighth century, and finally reached Europe during the twelfth century.



OPEN-PIT COPPER MINE

The Birth and Growth of Explosives

At the time that marauding Arabs were wresting the secret of papermaking from the Chinese, another significant development, destined to affect mankind profoundly, may have escaped their notice. This was gunpowder, being used for fireworks in China in the ninth century and possibly earlier. Although records are obscure, the invention of gunpowder is generally credited to the Chinese.

LIBERTY BELL

Dynamite, contrived by the Swedish chen
Alfred Nobel, in 1866, is widely used for min
quarrying, tunneling, road building, and
struction work; in fact, many of these operat
would not be possible without high explosi
In packing dynamite, great quantities of p
are used to form the "cartridge" containers
for lining the boxes in which the dynamite
tridges are packaged.

While gunpowder, or black powder, was
merly used as a propellant for firearms and
non, it has been supplanted almost entirely
smokeless powder, in the production of wh
wood pulp is used.

High explosives are exceedingly important
the efficient mining of copper, and certain
deposits could not be worked at all if blas
were not possible. In underground and open
mining operations, high explosives do muc
the heavy work of shattering and loosening
ore and rock into pieces small enough for
venient handling. In underground mining op
tions, where the ore deposits are located far be
the surface, vertical shafts may descend into
earth to a depth of as much as one mile, with

PAPER • BOOKS

ontal tunnels or "levels" dug at varying heights. ach level has other tunnels, or corridors, running t right angles, called "crosscuts." From these rosscuts, short tunnels, known as "drifts," lead o the chambers, or "stopes," where the copper is ctually mined. In this manner, hundreds of miles f underground passageways are blasted out with igh explosives in order to extract copper from he earth. Another system of underground mining the caving method, whereby the supports in orked-out sections of the mine are deliberately eakened so that at the proper time the waste ock and timbers cave in and fill the excavated ortions.

Where the ore deposits occur near the surface, pen-cut or "strip" mining operations are used. uge sections of a mountain are blasted away steps or tiers, and the ore is removed by giant eam or electric shovels and ore trains that run long each level of the open cut. In all of these ining operations, explosives have an important le.

The quantity of high explosives used for the ining of copper is rather difficult to establish ac- urately because of the considerable variations in e copper content of different ore deposits, and e various types of mining operations employed. For example, it should require theoretically twice as much explosives to obtain a ton of copper from one percent ore as compared to two percent ore, yet differences in geological formations provide other factors that will affect the explosives requirement.

At Chuquicamata in Chile, as much as 800,000 pounds of powder have been exploded in one shot to shatter more than 1,000,000 tons of ore. As this ore contains about two percent copper, it required, in this case, 40 pounds of explosives to produce a ton of copper. However, the explosives requirement for the principal copper mines of this country is estimated to average 26 pounds for each ton of copper produced. On this basis, approximately 28,329,000 pounds of high explosives were required to mine the 1,092,939 tons of copper produced in the United States in 1943.

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NUMBER ONE

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EDWARD L. GRANT, Art Editor

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This paper, coated with a lacquer cont
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signs and colors having wide application
box cover, and for other purposes whe
attractive and soil-resistant cover is de

THE COATING OF PAPER

by **WILLIAM BOND WHEELWRIGHT**

HE beginnings of the art of coating paper are hard to place with any certainty. R. H. Clapperton credits the Chinese with ving been the inventors "of loading, sizing, d coating of paper."[1] He goes as far as to al- ge that the original papermakers "made paper six centuries before its secret was known to yone else from ex- tly the same materials d in the same way as is made in the hand- ade paper mills of Eu- pe and the rest of the rld at the present ne."

It is easy to surmise y it appeared desir- le, after printing from allow woodcuts and ll shallower wood en- vings, particularly en color was em- yed, to find some ans to smoothen the egular surface of pa- r. At first this was ne by burnishing each et by hand with some t of glossy stone. en the glazing ham- r was first invented out 1540, it caused a d between the stone- zers and the hammer-glazers which lasted re than 150 years.[2] Mechanical improvements e always been feared and fought by work- n who foresaw the loss of their trades, with- realizing that the cheapening of products s bound to increase the demand and create re jobs.

he hammer-glazers were no doubt equally turbed in 1720, or thereabouts, when some tchman introduced a pair of copper polishing s, which expedited the smoothing of paper and led to the invention of the sheet plater. As soon as the making of paper by machine in continuous webs began, the sheet calender was naturally superseded by the supercalender, or the machine calender stack.

The glazing hammer, circa 1680.

A simpler means for smoothing paper to prepare a surface for printing fine copper or steel engravings was to dampen the sheet and impress it with a smooth plate, adapted to the size of the engraving, which was afterward printed over the plate mark.

None of these expedients fully satisfied the requirements of nineteenth century printers, particularly after the advent of the halftone engraving. But the ultimate solution by means of coating was arrived at independently from the printing industry.

It appears that the introduction of hanging papers, printed in color designs from wood blocks, called for some kind of "grounding" on the surface of the paper, capable of holding up the color and preserving the brilliancy of its hues. Some sort of a coating mixture was contrived, which was applied to sheets of handmade paper with a brush, to supply a ground, or "color," for the printing blocks.

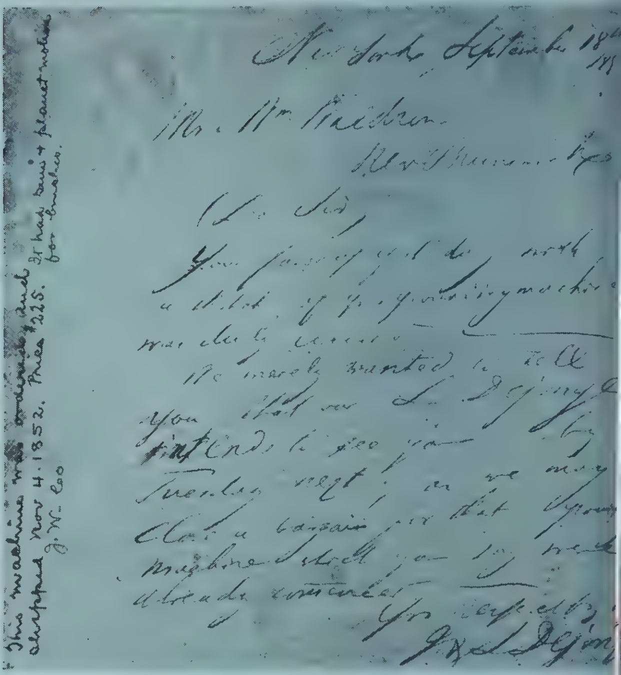
The Chinese appear to have invented wallpaper, and it is said the French began making paper "hangings" as early as 1620. In the United States the first wallpaper factory was established (according to an account in *The Great Industries of the United States*) in 1775, and within twenty years from that time there were manufactories in Pennsylvania and New Jersey and Boston, Mass.[3]

---

erton; R. H., *Paper, An Historical Account*, London.
re, E. J., *A Dictionary of Paper and Papermaking Terms* (Intro- n), Amsterdam, 1937.
ord, J. B., *The Great Industries of the United States*, Burr & 1873.

The old "Rigging House," 120 William St., New York, warehouse of America's first manufacturer of coated paper.

A letter referring to the first coater built in 1852 by William
dron for Louis Dejonge & Company. Prior to this the com
coated paper by hand.



New York, September 18th
18

Mr. Wm Waldron

New Brunswick

Dear Sir,

Your [illegible] [illegible] [illegible] [illegible] of the coating machine was duly received

We merely wanted to tell you that our L. Dejonge [illegible] intends to see you [illegible] Tuesday next, [illegible] we may close a bargain for that [illegible] machine [illegible] you [illegible] already [illegible]

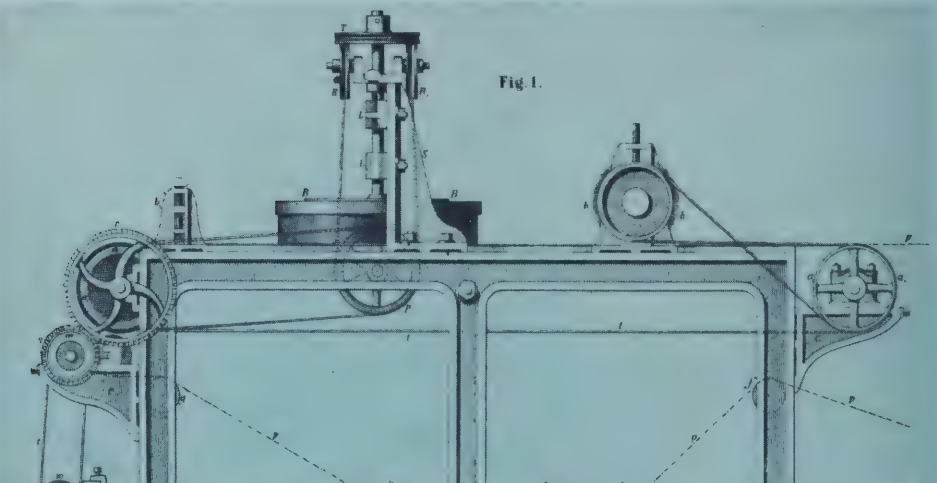
Yours respectfully,

[illegible] Dejonge

This machine was ordered and shipped Nov 4. 1852. Price $225. J. W. Co

It had [illegible] + [illegible] for brushes.

Fig. 1.



Wallpaper-coating m
of about the year

The first patterns with glazed grounds (i.e., ted and glazed) were made in the United tes in 1824. . . The process . . . is similar to t of calico printing. . . At first the paper was de in sheets not more than thirty inches long. . The introduction of new machines gave s from one thousand to two thousand yards length and from twenty to forty inches in lth."[3] This paper was printed in the web, and ourse had been coated previously in the web, much the same principles as were prevalent il quite recently.

ut there were two other trades among the y users of coated and glazed papers, label ters, and paper box manufacturers. Fifty rs ago, in the October 15 issue of the *Paper de Journal,* one of the very few articles yet lished about the history of coating paper appeared. We take the liberty of making the following quotation from Ethan Allen Doty's que story.

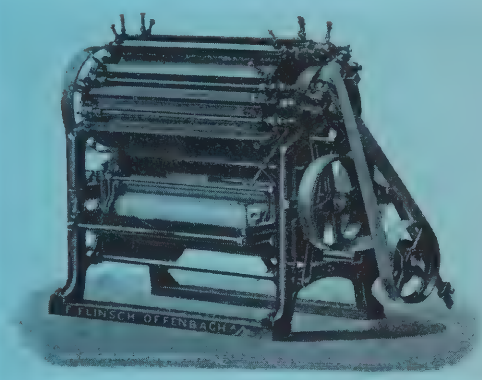
My father, Warren S. Doty, . . . formed in), a partnership with a Mr. Pollack under firm name of Pollack and Doty, the purpose hich was to print labels for the print works, cotton mills, and for proprietary medicines. . . ery soon they found it desirable to print e labels on paper with a colored, coated und, or face, and to produce these papers firm established a small factory in a loft in ice Street" (New York), and here the paper, eam or two-ream packages, was coated sheet heet, the color being brushed on it by girls, se aprons were covered with blotches of all s of colors; then the sheets were hung on ts which rested on wooden racks, where they ained overnight—sometimes longer—to dry. re was a plating machine and a screw press, papers desired for the firm's work requiring a plated finish. This, I think, was the earlit attempt to manufacture surface-coated pers in this country.

he trade, however, began to develop. Geo. raft, who had been making and importing ry boxes, began to import these papers for eral use, and soon established a fine and exive trade. A German named Dobler started ufacturing in a small way at first in Nashua, H., but later formed the firm of Dobler & , at Albany, N. Y., which was afterward ceeded by the Albany Card and Paper pany. Some of the parties at Nashua also ed the Nashua Card and Glazed Paper pany, and both did a large and prosperous ness."

1845, Mr. Doty formed a partnership with Peter G. Bergen, who already had a coating plant, but retained his office and warehouse at 120 William Street, New York, in a building known as the old "Rigging House," which had the distinction of being the birthplace of Methodism in America. "There it was," relates Doty, "that Philip Embury, a carpenter who had emigrated from Ireland, conducted religious meetings, while during the Revolution, Capt. Thomas Webb, an officer of the British army, preached there, arrayed in full scarlet uniform, and with his sword laying on the table before him." Fortunately we have a picture of this early home of the coated-paper industry, which appears to present a window display of Doty & Bergen products. But in 1850 the old "Rigging House" was torn down.

The pioneer firm became well known, and after a while its name was changed to Doty & Scrimgour, finally moving its plant to Reading, Pa. I last heard from Ethan Allen Doty during 1914, when in reply to my enquiry for historic facts about paper coating, he referred to the article from which quotations have been made. He was then an old man, and some years afterward his firm went out of existence.

Only one year after the establishment of Doty and Bergen, the famous firm of J. & L. Dejonge (now Louis Dejonge & Co.) was formed at Staten Island, in 1846. They wrote a new chapter in the coated-paper industry by ordering the first paper-coating machine ever used for manufacturing glazed papers, from William Waldron, member of the John Waldron Co., dating back to the year 1832, who had for some time been making "grounding" machines for the paper-hanging industry.



Coating machine of about the year 1882.

The letter addressed on September 14, 1852, to Mr. Waldron is worth quoting:

> "Dear Sir,
>
> "We intend to purchase a coloring machine of the best and newest style and with all the new improvements, such as are used now by the larger paper hanging manufacturers.

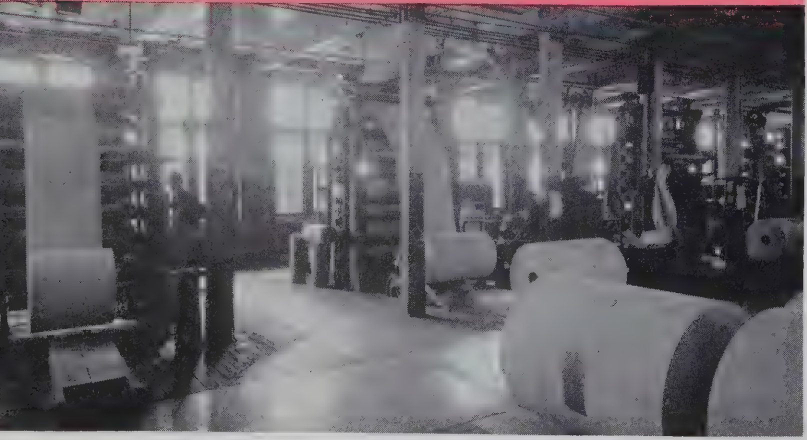
> “We therefore would thank you to inform us at your earliest convenience, whether you are building such machines to order, or if you have some always on hand.
>
> “The rollers must be wide enough to color at least 24 inches paper. Please to state at the same time your lowest cash price.”

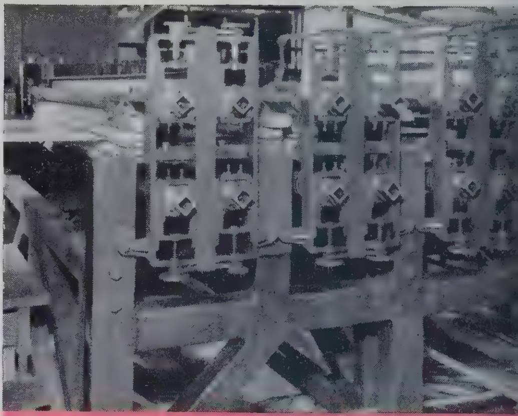
The bargain was finally made for the price of $225. The machine had what was known as a “sun and planet motion” for distributing the color. A drawing of such a machine has fortunately survived, showing the model of about the year 1860. This picture describes better than words the way the mechanism worked.

After the web of paper had received the coating, or “color,” it was carried by a “hanging machine,” in festoons for a distance of from two to four hundred feet, above the steam-heated pipes which rested on the floor. Then having been wound into rolls, was taken to the friction calenders for glazing. In some mills a higher polish was obtained by the application of “flinting machines.” This process was nothing more than a mechanized means of the ancient hand process of burnishing paper in the sheet by hand.

As a young paper salesman, soon after 1905, I visited many coating plants where the George W. Wheelwright Paper Company provided great quantities of “coating raw stock.” The equipment at that time was not essentially different from the description given, except that the “sun and planet” brushes had been superseded by rotary brushes to apply the “color,” and by oscillating brushes for its distribution. I shall never forget the stifling fumes in the dry, hot air, redolent with ammonia. I wondered how men could work their long hours in such an atmosphere. The modern enclosed drying cham-

A battery of supercalenders for finishing coated cardboard.





**Coating brushes, coating simultaneously both sides
paper web 90 inches in width.**

bers are a vast improvement over such c
methods. Nevertheless, nothing has suppla
“flint glazing” for producing the glossiest fi

With the exception of glazed paper for la
the early coated product was used chiefly
box coverings, either plain or embossed. It
not until about the first of the year 1875
coated paper was used for job printing.

At that time, Theodore Low DeVinne,
celebrated New York printer, hit upon the
of using such a paper for a costly catalo
which the printing included colors. Hith
paper had been coated on only one side,
DeVinne wanted to have some made with c
ing on both sides. His paper dealer, Willia
Dean, took the problem to a factory in Spr
field, Mass., where Charles M. Gage wa
charge of manufacturing coated-one-side, gl
paper. He experimented with coating both s
and accepted the first order for such paper
about 100 reams. The results were entirely s
factory from the fine wood engravings, and
DeVinne was much pleased.

Apparently no more of this paper was n
for printing until 1881. At this time Mr. C
had recently installed a coating plant for S
Warren Company, at Cumberland Mills, M
to make coated label paper. DeVinne had b
producing the *Century Magazine* for some y
which was noted for its beautiful wood eng
ings. These were so finely engraved that it
curred to him better results might be obtaine
changing from supercalender to a coated st
Quite naturally he again turned to Mr. Gag
make what he described as “fine cut” pa
coated two sides. This was before the da
halftone engraving, but the delicate wood
gravings were nearly as shallow, so that th

luctions on the new coated or "fine cut" er turned out to be superior in detail. Thus w use for coated paper was established, and afterward, with the introduction of photo- aving, it became the standard paper for fine one printing.

Mr. DeVinne wrote in 1901, to Mr. Dean, toengraving on so-called halftone cuts ld have made a mean showing without it. ed paper has been the salvation of many gners and artists who could never have their work properly executed by engraving vood. But it has been the death to the en- ers on wood. How few of them are left! trade or art has been completely knocked

e recent history of coated-paper manufac- has been chiefly a matter of refinement and ased production. Improved adhesives made sein, or of starch, have been substituted for Means have been found to produce good ing surfaces without excessive gloss, so dis- ng to the reader's eyes. Methods have been nted to coat both sides of a web simultan- ly, instead of one side at a time. The ap- tus for drying in enclosed chambers, under precise atmospheric and thermostatic con- and at higher speeds has improved the ty and lessened the cost of coating paper.

e coated-paper industry began as a con- ng business, depending upon paper mills a supply of coating raw stock. Many book-paper mills have installed their own ng departments, leaving the converting devoting itself to box papers and other alties. Only a few converters still find it table to compete in the manufacture of d book paper. The introduction of nitro- lose and other cellulosic coatings has opened npletely new field, but we shall leave the ry of coating paper at this point.

e final step in the streamlining of coating r for the magazine field and even for book vertising papers has flowered quite recently big business. In England, experiments in ng paper on the paper machine itself began e the year 1900. My brother, the late y M. Wheelwright, made sketches of such cess at that time, a copy of which I ob- d from his good friend, the late John Tra- of the Mead Corporation.

quair was a pioneer at machine coating in ountry, having run a test before his advent United States, about 1909, at the Kinleith of Henry Bruce & Sons Ltd., at Currie, thian. He repeated his experiments at the American Writing Company's Wauregan Mill about 1915, and at the King Paper Company, Kalamazoo, in 1919. The following years he continued experiments with the Mead Corporation.

It was Peter Massey who first overcame the many difficulties with lasting success at the Consolidated Water Power & Paper Company, Wisconsin Rapids. The paper coated there on the paper machine for rotary printing was adopted by *Life Magazine* with notable success. Other manufacturers have subsequently mastered the techniques, and machine-coated paper has taken its place as a standard for magazine production and is finding an increasing market for job printing.

It is too early to say that machine-coated paper may supplant paper coated by the earlier methods. Its virtue at present appears to be the production of a printing paper which gives results superior to supercalendered paper, at a price which makes it more practical to use. The very fact that some book-paper mills equipped to make this grade retain their regular coating equipment, and still produce a finer quality of enamel paper for high-class printing would indicate that there may always be a field for both methods, depending on the requirements to be met. On the other hand, much will depend upon developments within the printing industry, particularly as they concern illustrative processes.

Home of *Life Magazine*. *Life* is one of the world' **largest consumers of machine-coated paper.**

We must also bear in mind the number of uses for coated and glazed papers for a large variety of purposes, not necessarily directly connected with the graphic arts. Many of these do not depend upon cheap mass production, but upon imparting special properties for particular purposes. And remember always, that quality in paper depends upon its suitability for any given purpose. For many of these purposes, some sort of additives in the form of paper coatings will undoubtedly survive.

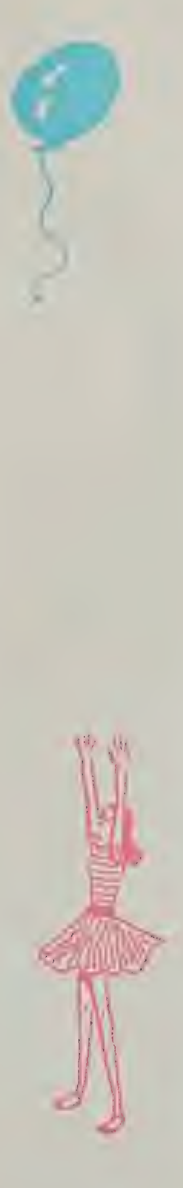
For illustrations appearing in this article we are indebted to: Mr. Dard Hunter, The Paper Museum, M.I.T., Louis Dejonge & Company, S. D. Warren & Company, Falulah Paper Company, and *Life Magazine*.

This Teakwood Gray pattern is one of many in which DI-LON appears. DI-LON is a wall covering with a paper base on which a photographic reproduction of a texture is printed with nitrocellulose lacquer which forms a protective coating.

Facing page 20 is the Black and Gold pattern of DI-LON.

KATHI'S ERIC

This simulated photograph is a "VITAPRINT" obtained by printing a very fine-screen halftone on special paper with special inks and then coating the resulting print with a lacquer containing nitro-cellulose. Dust or soil can be wiped away with a damp cloth.



CREATIVE COATINGS

Lacquers for Papers

by J. K. Speicher[*] and F. K. Shankweiler[*]

Lacquer and paper are closely related because both are made from cellulose.

In paper the hydrated cellulose is formed into sheets which retain the structure of the cellulose fibers. Because of this fiber structure, paper has, for example, opacity, absorbency, and tear strength. Other properties of paper also are a function of the characteristics of the cellulose fibers from which it is made.

In lacquer the cellulose is changed to a chemical derivative, such as nitrocellulose, ethyl cellulose, or cellulose acetate, which is dispersed in organic solvents and used to form a coating. In this coating the individual fibers have lost their identity and the product is not porous like paper but is homogeneous, dense, and transparent. However, like paper, many of the characteristics of lacquers result from the fundamental properties of the cellulose from which it is derived. Accordingly, it is not unexpected that lacquers made from cellulose derivatives find a particularly suitable field of use as paper coatings, and that the growth of cellulose-derivative paper coatings in the last few years is of an impressive magnitude.

Many Desirable Properties

Properties of cellulose and its derivatives which are of especial value are toughness and hardness. This combination gives flexibility, resistance to abrasion, nonblocking, gloss, generally attractive

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[*]Cellulose Products Department, Hercules Powder Company.

appearance, and pleasantness to touch. Besides, by proper selection, one may obtain water resistance and protection against grease and oils; in other words, a surface which doesn't tend to collect dirt, but which can be cleaned if it does become soiled.

Papers of distinctive appearances or unique characteristics are constantly wanted by package designers and others who create the appealing products and packages demanded by a quality-minded purchasing public. The more useful papers have, in many instances, replaced cloth, coated fabrics, leather, or wood. For papers embodying unusual properties, the most lucrative markets exist. A look at the diversified utility of cellulosic-coated papers is persuasive evidence that, first, they combine a rare combination of characteristics possessed by very few film-forming materials, and, secondly, their commercial acceptance is the result of a similar pattern in each instance—the most practical way to achieve a group of difficult specifications, unusual features, or special properties.

The easiest way to describe the usefulness of this unusual combination of properties is to list some of the uses of lacquered paper products. Each selected use illustrates one outstanding feature, which, however, must be combined with several other properties to insure success. In the table the properties required or desired for each use are indicated by ○ with the most critical property indicated by ●.

The Playing Card as an Example

Consider, for example, the first item listed, namely, playing cards. Millions of decks are used each year, most of them made of paper and the better ones with a surface finish. The most satisfactory finish, and one used in large volume, is a clear nitrocellulose lacquer. The lacquer finish on playing cards is a particularly good example of the combination of properties obtainable with cellulosic lacquers. Any finish which meets all the requirements of this use would be more than good enough for a myriad of other uses.

Perhaps the most critical requirement of a playing-card finish is pleasantness to touch. Obviously, a coating which is harsh to the touch or, on the other hand, so smooth as to feel greasy or otherwise unpleasant will not do. But along with

PROPERTIES	PLEASANTNESS OF FEEL	RESISTANCE TO SCUFF AND MAR	LIGHT COLOR	GLOSS	WASHABILITY	TOUGHNESS	ATTRACTIVENESS	TRANSPARENCY	PERMANENCE	FLEXIBILITY	ADHESIVENESS OR BINDING PROPERTIES	RESISTANCE TO HYDROCARBON SOLVENTS	SLIPPERINESS	NONBLOCKING	RESISTANCE TO OILS AND FATS	WATER RESISTANCE	HEAT SEALING
ls	●	○	○	○	○	○	○		○	○			○	○	○	○	
		●	○	○	○	○	○		○	○			○	○	○	○	
els		○	●	○	○	○	○		○	○			○	○	○	○	
Wrappers	○	○	○	●	○	○	○		○	○			○	○	○	○	○
	○	○	○	○	●	○	○		○	○				○	○	○	
	○	○	○	○	○	●	○		○	○			○	○	○	○	
overs	○	○	○	○		○	●		○	○			○	○	○		
ers	○	○	○	○		○	○	●	○	○			○	○		○	○
	○	○	○		○	○			●	○		○			○	○	
ven s			○		○	○			○	●					○	○	
Papers					○	○			○	○	●	○			○		
tive pe			○	○		○			○	○		●			○	○	

● Indicates most critical properties.
○ Indicates properties desired.

the smoothness required for a pleasant touch, there must also be: the proper slipperiness for easy shuffling and dealing, absolutely no tendency toward blocking, a controlled degree of gloss to avoid eyestrain, excellent flexibility, resistance to scuffing, resistance to soiling, washability, absence of yellowness or other color, an attractive appearance, and, since playing cards with these properties will be used for a long time, permanence of all these characteristics. It is remarkable that all of these qualities can be incorporated in a coating a fraction of a mil thick, and at a reasonable cost.

Labels and Other Lacquered Papers

Item No. 2, labels for cans, illustrates a use where resistance to scuffing is the most important requirement. Canned goods are subjected to rubbing one against another during shipment and handling. Some coatings under this abuse will scuff and turn white or even be completely rubbed off; whereas nitrocellulose lacquer will take a lot of punishment without ill effect. Here again numerous other qualities are either essential or desirable to insure success, notably, pale color and good gloss. Where the package is used as the dispensing unit, as in the case of soap powders, detergents, salt, baking powder, and similar household items, the waterproofness, greaseproofness, toughness, and over-all durability of nitrocellulose lacquer make it an ideal coating which keeps the container in good condition until it is finally emptied.

Space does not permit a discussion of each item on the entire list, but in most cases the reader can make his own analysis of the requirements and note that lacquer fills the bill. Also, the list could be lengthened with many other examples of typical uses of lacquer on paper.

In considering the emphasis on different properties in connection with different uses, one should remember that there is no such thing as a typical paper lacquer. Although the majority of cellulosic lacquers are made from nitrocellulose, many are made from ethyl cellulose and some from cellulose acetate. Each of these derivatives is available in a variety of types. Lacquers are seldom composed solely of cellulose derivatives but are modified with plasticizers and resins. There are almost no limitations to the variations that may be made in formulation with consequent variation in specific properties.

The Lacquer Formulator's Task

The good lacquer formulator takes advantage of these possibilities and adjusts the formula to bring out the particular property most important for any given use.

For example, a playing-card lacquer, where there is no sealing problem but where, on the contrary, the slightest tendency of two cards to stick together would be fatal (maybe in more ways than one), would not be formulated the same as a lacquer in which heat sealing was a prime requirement.

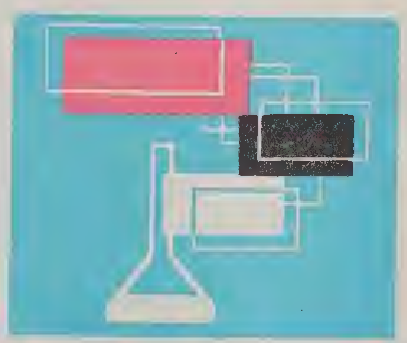
The lacquer formulation must also be adapted to the coating equipment used. While suitable equipment must be used for applying lacquer, the term "suitable" covers quite a wide range. Various types of roller coaters, knife coaters, and automatic spray guns are being used. Also printing equipment, such as rotogravure and aniline presses and screen-printing apparatus, may be adapted to lacquer coating. In any event, some provision must be made for drying the coating by evaporation of the volatile solvent and for disposal of the solvent vapors.

Lacquer-Type Inks and Kindred Products

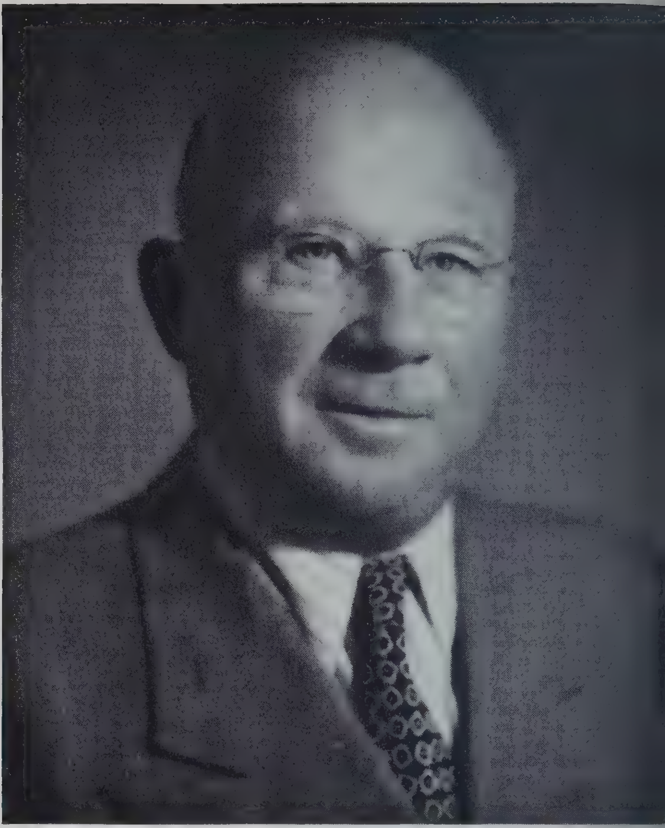
Mention of printing equipment for lacquering brings up the subject of lacquer-type inks. Lacquer coatings and lacquer inks are so closely related that it is sometimes difficult to classify a product as one or the other. Sometimes paper is printed with a design which covers practically the entire surface, using ink made from nitrocellulose or ethyl cellulose. The result is, in effect, a lacquer-coated sheet. By using equipment which will handle this kind of ink, a clear or colored lacquer coating can be applied to either a portion or to the entire surface of the sheet.

There are other uses of nitrocellulose coatings on paper that, like inks, are not lacquers, technically, but are quite closely related. One example is the adhesive coating used for attaching flock to paper; this coating frequently is a nitrocellulose composition. Another is the coating on stencil paper used in mimeographing; it is a very soft sort of lacquer. Another is the heavy coating on the edges and tabs of index cards, usually referred to as a plastic coating.

In developing each of these specialized products, someone took the general properties of lacquer and of paper, combined them with imagination, skill, and perhaps a dash of genius, and came up with something new. One word describes the contribution made by the use of cellulosic lacquers on paper — creative.



An example of a paper simulating leather. It is made
impregnating the sheet with latex in the beater, and
surface is afterward coated with a nitrocellulose lacq



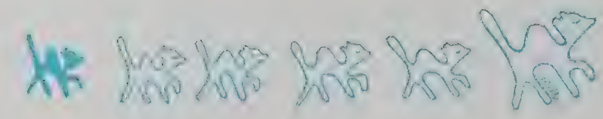
M. BRISBOIS

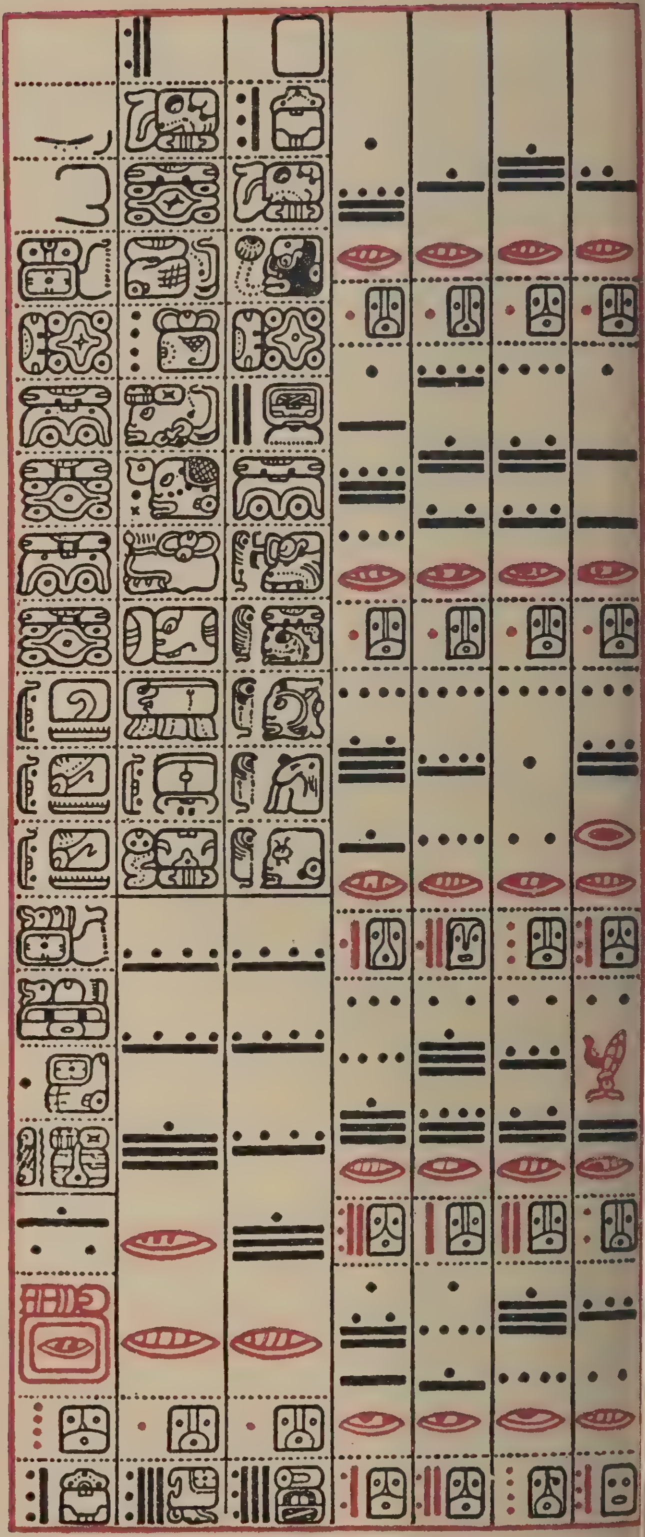
TO N. M. BRISBOIS—for his more than 45 years of association with the pu
and paper industry, he having worked during his earlier years in a nu
ber of mills in the United States, both in the Middle West and the East, a
in Canada; for his tenacity of purpose during those years to complete, throu
home study and correspondence instruction, a course in engineering; for
several years as assistant field engineer for one of the leading United Sta
manufacturers of papermaking machines—an association that brought h
in contact with the construction and starting of a number of pulp and pa
mills in the United States, Canada, and Russia; for his later work in conn
tion with the construction of two large mills in the Middle West; for his
sociation in 1924 with a Pacific Coast firm as resident manager of a mill
the Coast, and for which, after a time, he took over all of its Pacific Co
operations including the operation of a new kraft pulp and paper mill—
present company, organized in 1927 through a merger, and of which he
now vice president in charge of developments and manufacturing, consist
of six paperboard mills, six shipping-container plants, and five lithogra
and printed carton plants—also two subsidiaries which manufacture cor
gated shipping containers, and two glass bottle plants, there also being p
sently under construction a 260-ton kraft pulp and paperboard mill, a logg
railroad, and many miles of log trucking road; and especially for his apprec
tion of the accomplishments of others—a kindly human attribute that
readily gives credit where credit is due.

ROBERT
NIVISON

ROBERT NIVISON—for his broad understanding of both the practical and
echnological aspects of papermaking—he having started his papermaking
r in Guard Bridge in one of the leading mills of his native Scotland, working
the able direction of his father, an outstanding papermaker of the time; for
lucational background which includes St. Andrews University and the winning
ghest honors in the City and Guilds Institute of London pulp and paper-
ng examinations open to papermakers throughout the British Isles; for his
on in 1904, while visiting friends in the United States, to cast his lot with
idustry of this country—accepting a job as night superintendent of a promi-
New England mill, a mill operated by a firm with which he has since been
uously associated, transferring from it in 1905 as superintendent to one of
ther mills of the company and remaining there in that capacity until 1916,
ing at that time to the mill of his earlier association as manager of mills,
tion which he still holds—being responsible for all the plants of the company
mills in New England, one mill in the South—having a combined productive
ity of 540 tons of pulp, and 520 tons of paper a day); for his further pro-
ns with this firm—becoming a director in 1931, a member of the executive
ittee in 1943, and vice president in 1945—each promotion evidence of a job
lone; for his numerous hobbies—music, photography, golfing, fishing, and,
lier years, boating—which portray a many-sided versatility; and—most of
a keen sense of humor and a spirit of generosity which together go far to
happiness and cheer to others.

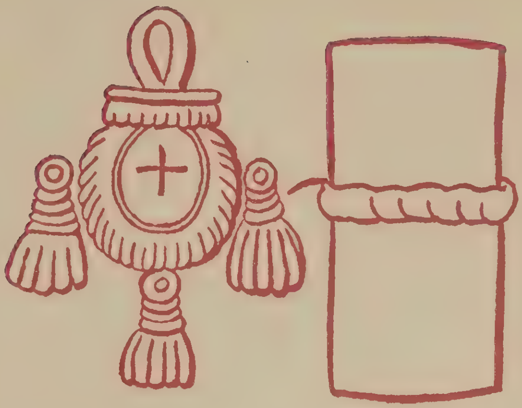
This is a 70-73 lb./500 kraft paper coated with a lacquer containing Hercules nitrocellulose. It has wide application in the bookbinding industry, as well as in the album and box industries.





The Dresden Codex, executed on *huun*-paper in the period of the League of Mayapan. This is the most famed of all extant records of America's civilizations.

THE AZTEC AND MAYA PAPERMAKERS



Symbol indicating 8000 rolls of *amatl*-paper.

A REVIEW OF DR. VICTOR W. VON HAGEN'S BOOK

By WILLIAM B. BEATTY

HE development and flowering of a cultural civilization chiefly on a basis of paper may seem to some a new concept of history, yet this has taken place ndependently in three great civilizations of the world — those of the Chinese, the gyptian, and the Aztec-Mayan groups. Wherever tribes sought to change their ral traditions, rituals, and laws into something with more substance, a form more ermanent, there paper (or its equivalent) came into existence, to thrive and ourish concurrently with the cultural advance of the people. With the coming f records on books and scrolls, they were released from the restrictions of face-to-ce contact in both space and time. The hold which paper took in the development of the Middle American cultures, and its manufacture, for it was indeed a eritable industry, is well told and illustrated by Dr. Victor von Hagen in *The ztec and Maya Papermakers.*[1]

After sketching in several centuries of early tribal history, there is described rough the conquests and the growing power of the Aztec city-state government e rise of a unique use of paper — the "paper tribute" or levy on conquered tribes. aper was only one of many items of goods and produce included in the tribute sts, yet yearly taxes gathered into the Aztec treasury grew to count hundreds upon undreds of thousands of sheets and rolls of paper, all produced by hand beating. Twenty-four thousand *resmas*[2] were to be brought annually to the Uei Tlatoani Tenochtitlan." From a translation made in 1535, known as the *Codex Mendoza,* e learn that this amount was the tribute from a single village area! By the eginning of the eighteenth century at the time of Cortés, the use of paper gained tribute in recording religious, magical, and historical affairs, together with

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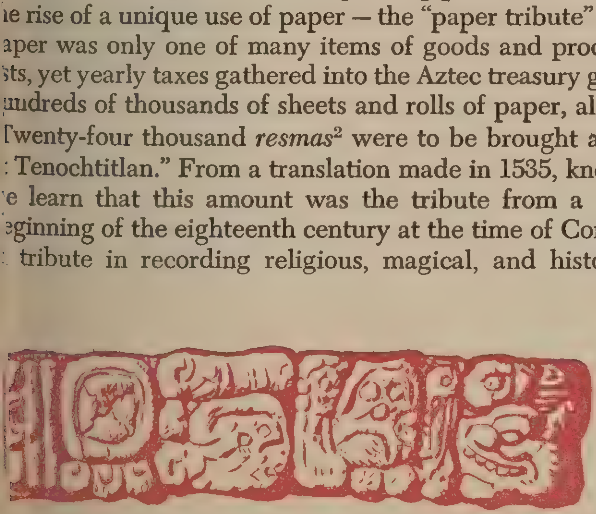
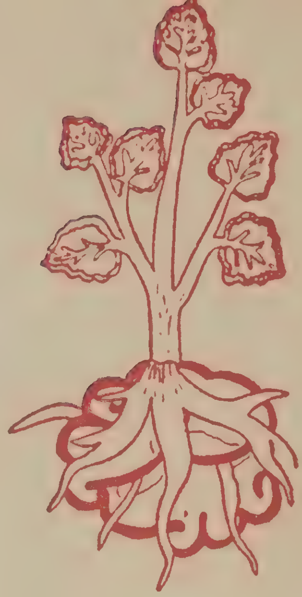
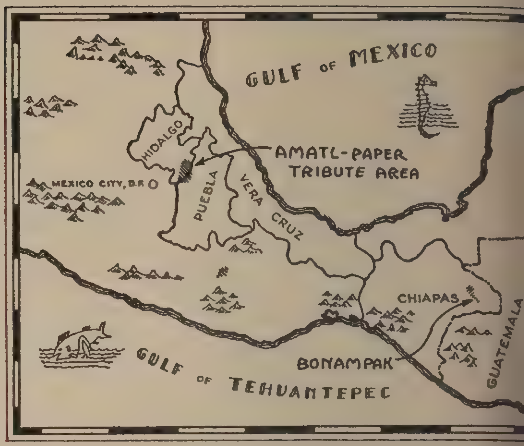
[1] New York; J. J. Augustin, Second edition, 120 pp., 39 plates, 1944.



oration by courtesy of UNITED FRUIT COMPANY

The only known Aztec drawing of the "Paper tree," *Amacoztic.*





Index map of Southern Mexico.

preparing news releases, and reached a peak not regained in the New World un rather recent times.

Historical and archaeological research into most early civilizations has ge erally been aided by the existence of quantities of written records. Here, ho ever, the Conquistadores in their ruthless destruction of "things heathen" l but little, and only fourteen written books or manuscripts in all have surviv until today. With very meager and conflicting records, and only a few act specimens of old paper itself existing in scattered fragments stored in museum the problem of unravelling papermaking technique as practiced five or six centur ago becomes involved.

Paper was made from what material — and how? This question is pointed with quotation and analysis of representative sources of record of the Conqu and subsequent investigation. At this point, with no answer forthcoming fr the archives, the search moves to present-day papermaking as followed by t Sumu Tribe in Honduras and by the Otomi Tribe in the States of Hidalgo a Puebla in Southern Mexico.

Manufacture of paper today is rapidly dying out, for it is employed only as accompaniment to certain witchcraft rituals and tribal ceremonies that are follow in secret by a few patriarchs. No other use seems to exist for this handmade pap and the areas where it is made at all are limited and remote from outside dema Present-day natives follow a procedure closely aligned with that of ancient tim even to the point of preferring the early beating stones, or planches, as th tools. These stones are in some areas the most frequently uncovered pre-Columb artifacts. Bark taken from any of several varieties of the wild fig trees is strip away from the inner "bast" fiber, and this inside long-fibered material is t boiled or soaked in limewater to remove a latex-like sap. The cleaned fibe then beaten against a board ("felted") and left to dry. These steps are identi with the procedure followed by the Aztecs in preparing their tribute to Montezu II of one hundred sixty thousand sheets that were sent yearly from this particu Otomi region. The paper produced is identical, and this is borne out by a num of microphotographs. Similar species of fig trees furnish like fibers for this w Some areas were entirely denuded by bark-strippers—even then! Paul C. Stand of the Field Museum of Natural History at Chicago, has contributed a cha on the American Fig Tree.

There has existed for centuries an unfortunately well-documented belief t

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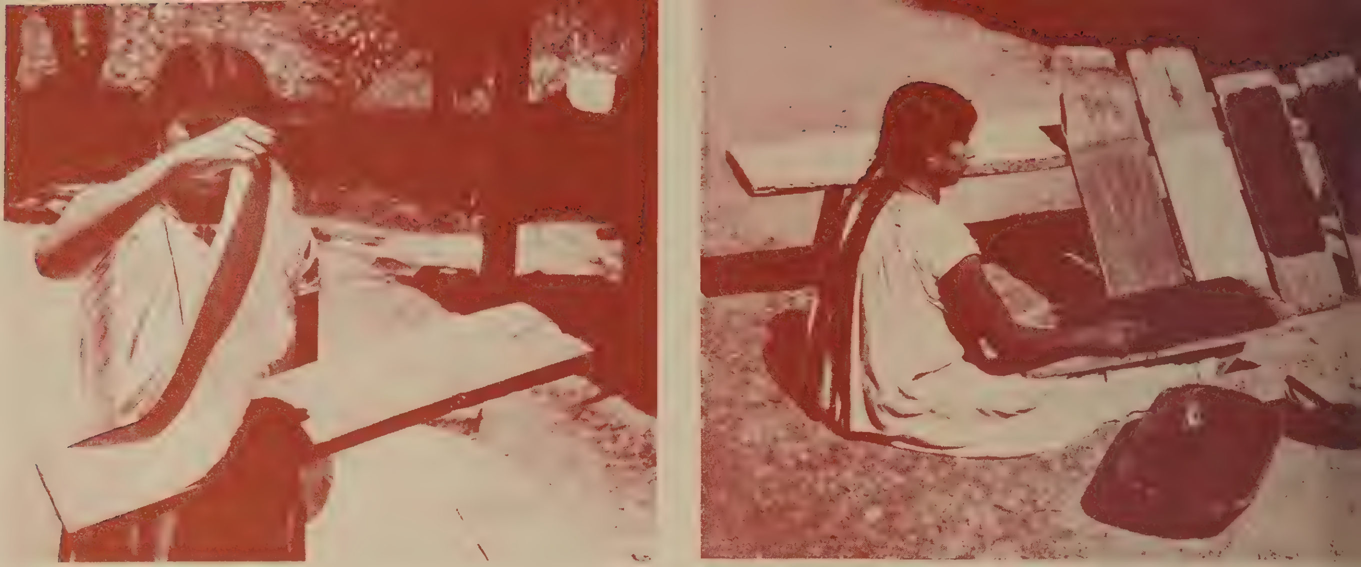
[2] *Resma* translated directly from the Aztec *pilli,* or twenty. The Spanish *resma* derived from the Arabic *rizmah,* a bundle, especially a bundle of paper. This in turn was adopted into the English form as *ream.*

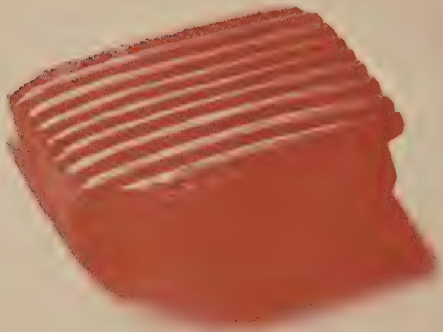
ztacamatl, the white-barked wild fig.

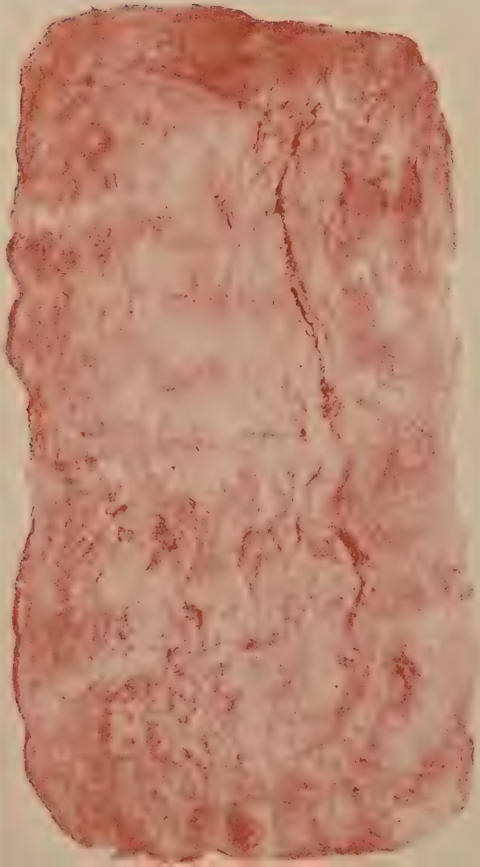
The Plumed Serpent columns of the Temple of the Warriors in *Chichen Itzá.*

On the left, the man is stripping fiber from the bark with a machete. Below, the woman is holding strips of fiber after boiling them in limewater. Next is shown a strip of fiber of the inner bark fibers. At the lower right is shown the felting of small fiber strips, with a result closely approximating our papers.

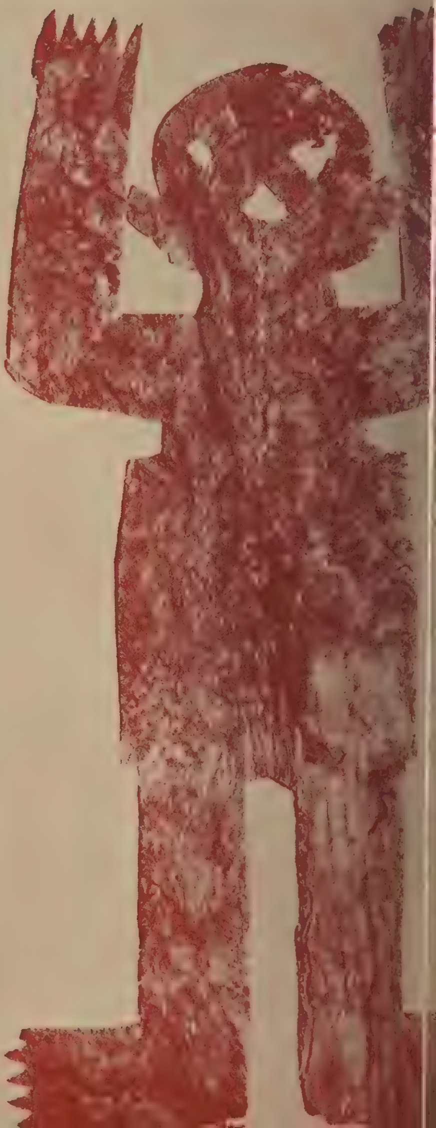


Above, at the left, a sheet of finished paper is peeled from the board. Next, an Aztec papermaker of *Chicontepec* displays her four kinds of paper. The grooved object is an artifact from the *Valley of Mexico*, a stone bark-beater fashioned for making *amatl* paper from fibers of the wild fig tree.





An example of *Xalamatl-limon* paper is shown at the left, made by the *Otomi* Indians.



A paper doll made of dark *Xalamatl*-paper, used in witchcraft by the *Otomi* and *Aztec* Indians.

Rebus-drawings and heraldic shields of *amatl*-papermaking villages.

ayan and Aztec papers were made from fibers of "metl," or maguey, the century ctus.[3] The fibers of this plant are entirely unsuitable for papermaking, and it is finitely shown that native paper, in both present-day and pre-Columbian times, s always been made from the inner "bast" fibers of the fig and mulberry trees. kewise, the author discusses bark cloths made by native tribes the world over d shows where true paper is distinct from this material, although it grew out of e same basic process.

Informal and easy presentation invites the lay reader to slip into the feeling of e lengthy research task almost as a participant, for this book lacks the usual dantic dryness sometimes attendant in descriptions of such projects. Notes are ved for the appendix which includes a partial list of existing Aztec Codex frag- ents. An extensive bibliography lists both English and Spanish sources dating ck to 1571. Dr. Dard Hunter, of the Massachusetts Institute of Technology at mbridge, in a brisk introduction calls the book "a painstaking and comprehensive hievement" and further testifies to von Hagen's position as an authority — an pression one gets in reading any place in the text. Linen bound and printed on t laid text, the book forms a very attractive volume. This trade edition includes text and plates of the earlier limited edition which came with samples of omi paper, and was one of the American Institute of Graphic Arts "Fifty Best oks of 1944." It is fitting that a book making such signal contributions to the e-Columbian history of paper in the New World should appear in a format that lects winningly the more advanced uses of paper in the world of today.

The photographs have been selected to show readers of THE PAPER MAKER the rious steps in the manufacture of native paper, and, unless noted, are from the nerous quantity in *The Aztec and Maya Papermakers.*

Marginal inserts are the rebus-drawings and the heraldic shields of the paper- king villages. These are for the most part located in the small area shaded on index map. In some of the villages, notably Itzamatitlan, Amacoztitla, and atitlan, the amatl-paper symbol is used, implying that the village was primarily own for its paper. All the others are equally famed for paper, but in addition duced other artifacts in primitive Indian economy.

Late in 1946, an expedition in the State of Chiapas in Southern Mexico spon- ed jointly by the United Fruit Company of Boston and the Carnegie Institution Washington discovered a group of eleven temples at the ancient Mayan strong- ld of Bonampak. These are believed to have been built between A.D. 495 and 62. The decoration used at bottom of page 17 is of an altar description, so far deciphered, uncovered at this latest Maya find, which is considered as the most portant American archaeological discovery in recent years. It is used by per- ssion of the sponsors.

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[3] Maguey—pita, aloe, or century cactus plant, the fiber of which is used everywhere in Mexico for rope and cloth making. In the Southwestern United States the term is applied to a slender, flexible roping lariat, and is pronounced "muh-GAY."

THE BIRDS AND THE BEASTS

THEY decorate the forests and the skies and make the outdoors animate with moving color. They are a living link with Nature, a symbol of her immutable ways. Theirs is a definite place in the scheme of things, that complements man. Their evolution takes place in an orbit all their own and is devoid of the conscious drive characteristic of man, that often veers into abnormal directions which Nature must periodically correct. Those members of the animal world that enter man's domain, to become companions and aids, acquire certain advantages but forfeit others. Those tha remain untamed preserve age-old instincts which endow them with a superior grace beside which all civilized mannerisms seem faltering and awkward. Wordlessly, these creatures observ Nature's laws, heed her warnings season by season, and live starkly close to necessity and its chastening rigors. Their nameless and dateless existences merge with the eternal cycles, and their identities assume an everlasting persistence.

—P. K. Thomajan

THE ADVENTURES OF NOSEY HILL

ILLUSTRATIONS BY IRWIN G. CONWAY

FOREWORD

HE folklore of America is richly human and much alive today. Folklore has always been e people's art. For ages its very existence dended on the telling of stories from generation to neration. And that's the way it should be. It is ond best to read a folk story in print. Its turalness is not of the printed page, but of the npfire, the chuck-wagon, the barroom, the eet corner. "But," says B. A. Botkin, outnding authority on American folklore, "that es not make it synonymous with illiteracy or orance, nor is it true that the educated do t also have their lore, or that lore ceases to be e as soon as it is written down or published. lk literature differs from the rest of literature in history; its author is e original 'forgotten n.'"

Folklore is not someng spun out of thin a, something fanciful, dden, artificial. The ots of folklore strike ep into the American l. Our grandfathers talked about real men: Billy the Kid, Jesse James, Casey Jones, Johnny Appleseed. And they talked about men who (whether real or not, to begin with) grew, it seems, more real through the stories that were told of their gigantic deeds of strength and skill. Such were Paul Bunyan, who could snap off a redwood tree for a toothpick; and John Henry, who could swing a thirty-pound hammer with astounding force and accuracy. They became the legends of an America that was working hard and growing fast.

Now the United States has become the greatest industrial nation on earth, and the telling of stories has been kept alive. A new type of legend has come into its own, the tall tale of occupational skill. These tales are filled with the boastful pride of specialized skill. The Rabelaisian antics of a Paul Bunyan or a John Henry have given way to the more technical, yet still prodigious, feats of American know-how.

Most of the Nosey Hill stories in this collection are taken from *Superior Facts*, which was a house organ of Paper Makers Chemical Corporation, edited by the late Ralph M. Snell. The contributors are listed as follows: Big Sez, Casper Grathwohl, Bing Sez, Richard Casper, Alec C. Duncan, Thomas L. Snell, Davie Fleming, D. M. Kelly, Cyrus Frye, George Bonner, Eugene Hibbard, William Stone.

Not appearing in *Superior Facts* are two additional contributors: Jim Tolland, Tom McDonnell.

Enter Nosey Hill. Nosey Hill, without benefit of halo, is the patron saint of papermakers. His legend is growing steadily, and though reports now tell of his death we have yet to hear the last of him. Nosey was an itinerant papermaker. He could no more stay put than a leaf in the autumn wind. It is possible that we would never have heard of him if it weren't for this wanderlust fever that led him to so many parts of the country. His cronies and fellow-travelers were colorful, but perhaps lesser-known men: One-Eyed Kane, Wild Bill McKenna, Red Jack Doherty, Tom Clark, Black Jack McCambridge, Bill McClellan, Dick Leary, and Davie Fleming. They were disciples of the old school of papermakers, and Nosey Hill was their master.

The facts of Nosey Hill's life, as in the lives of all good half-legendary figures, are few and little known. We know, of course, that he did exist, but few of the old-timers are now alive who knev
back in the old days, when he lived the legen
tell today. Perhaps a little wistfully, we reme
Nosey Hill as part of an era that has passed.

Some of the episodes you'll shortly hear (b
than read) are told in the first person. "A
occupational tale," says Botkin, "is told b
well as about, workers, and gives the feel c
job, something of how the work is done, and
the workers feel about it." Here, then, are
of the stories of the incomparable Nosey Hill
he worked at papermaking, and how he felt a
it. A good story is always good to hear, and
could be worse than a teller of tales. So here
Nosey Hill, to the trade he loved and prolif
cursed, to the trade that somehow deserve
touch of glory he gave it.

Thomas P. McDonnell

NIPPED FINGERS

It used to be said that you could never qualify as a good machine tender until your fingers had been nipped in the calender stack. However true this may be, Nosey had little sympathy for back-tenders who got nipped in this manner. When asked whether he had ever been nipped, Nosey would answer: "Sure, but I never made a fuss about it. Why, onc't I had my arm drawn into a calender clear up to the elbow but I just kept calm, and when the rolls started jumping I jerked my arm out and went along about my business."

NOSEY AND THE CROW

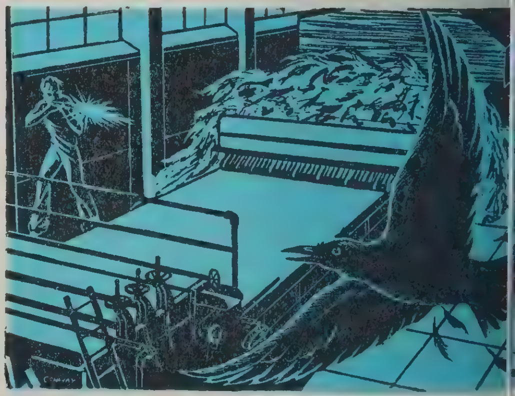
Years ago, I had the good luck to work for a while with Nosey Hill. One day the boys asked him to tell another of his famous yarns. Nosey then told of an incident which happened when he was running a machine up in Maine.

Everything, he said, was running smoothly one quiet day when —kapow!— the paper broke down. Before the machine crew could get it over the reel, the sheet broke down again. And so it went until the machine room was filled with a plentiful supply of broke and profanity.

Determined to find the cause of the trouble, Nosey let the broke run up wet on the second press, and then sat down to concentrate on how the problem could be solved. He had just st
to cut a chaw of tobacco when a big black
flew in through the ventilator, swooped
between the couch and first press, picked
piece of wet sheet, and flew away, apparent
line its nest.

Nosey dashed off, got a shotgun, and retu
to await the crow's next trip for nest lining.
damn-fool crow came back and suddenly per
in a load of shot from Nosey's gun. Nose
once took the paper over the machine and ha
more trouble.

Nosey, however, didn't figure his story
have any rebound, but whenever he went o
job he found himself greeted on all sides



Perished in a shot from Nosey's gun.

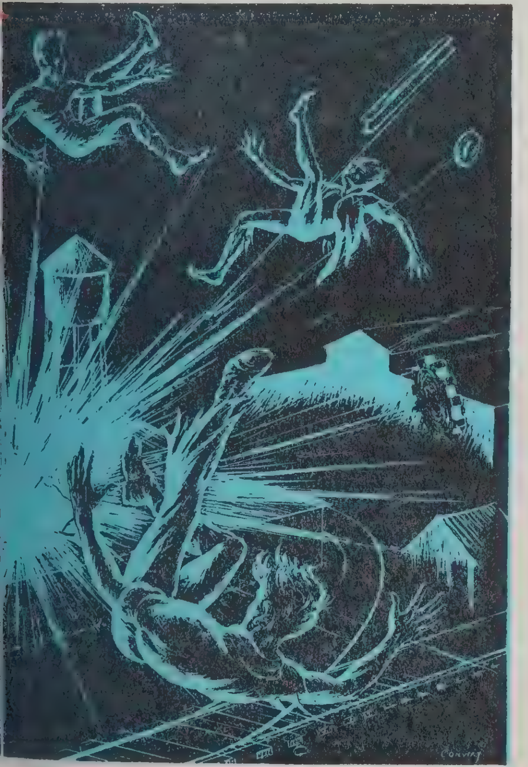
v! Caw! Caw!” This kept up so that Nosey to move on to another mill. He never told story again.

OSEY AND THE TOUR BOSS

sey Hill used to tell about the meanest tour he ever had, a feller by the name of “Flat- ” Harrison.

e night Flathead Harrison came into the ine room and told Nosey, who was then ng machine, to get some right fancy pro- ion out of “that there” machine—or else! , as you probably know, Nosey isn’t one to around very long. He stepped up that ine like she’d never been stepped up before. began to rattle. The Fourdrinier began to e like a bevy of burlesque queens. The driers n to sizzle. Steam filled the air, like fog off Grand Banks. And then it happened! Every- let loose and blew sky high!

Vell,” says Nosey Hill, “that tour boss was rn mean he docked the machine crew for the they went up in the air.” That was the last we saw Nosey Hill in these parts; he was disgusted.



Docked for the time they were in the air.

THE SLATE MACHINE

Nosey Hill once claimed, and proved, he could make slate on a paper machine. The superintendent to whom Nosey told this amazing fact brushed it off as one of Nosey’s jokes. But Nosey plagued him so much about it, the super finally said: “Sure, Nosey, if you think you can make slate, go right ahead. Don’t let me stop you. Why, we could sell shingles, couldn’t we? I’m sure the boss would be delighted. Sure, Nosey, you go right ahead and make all the slate you want.”

Well, of course, you and I know the super should have known better than that. Nosey went ahead and did just what he said he’d do. The super walked in one night, and there unbelievably was a sheet of slate coming off the dry end. A high-powered saw was cutting it off in slabs.

After they got the super down off the rafters, he asked, sort of wistful-like: “Nosey, tell me. How-in-the-pretty-little-flames-of-hell can you make slate on a paper machine? Tell me, oh tell me, or take me away!”

“Sure,” says Nosey. “No need to get so excited. Well, I sends to Arizonie fer some of them pet-re-fied trees, haves ’em ground fer pulp, puts the stuff through the beater, and there she is—slate. Antique finish.”

Nosey further said he didn’t think much of his discovery because, as he explained, of the wear-and-tear on the machine.

The super was a simple man—simple of heart, simple of mind. Nosey shouldn’t have upset the happy, dull routine he had followed in twenty years of superintending. But the poor feller left town the next day—wife, and family, and all. He couldn’t stand it.

THE MUD TURTLE

Once when Nosey Hill was on the bum, he came to a small mill where the backtender had just been boosted up to machine tender. Well, this machine tender was down at the wet end of the cylinder machine, fussing around. Immediately the sheet began to slip on the cylinder, and the rookie machine tender was getting his first real dose of trouble.

Nosey went up to him and said: “Say, son, the boss wants me to take over. Now, I don’t want her. Yer havin’ some trouble. Let me straighten ye up and I’ll beat it fer ten bucks.”

This looked like a good deal to the new machine tender. He borrowed a five spot from the backtender, contributed five ones of his own, and gave the total to Nosey.

Well, Nosey went back to the vat and fished out a little mud turtle that was trying to climb up the side of the cylinder. He put the turtle, about the size of a half dollar, into his pocket and walked out, not only with all his usual nonchalance but also ten bucks to the good.

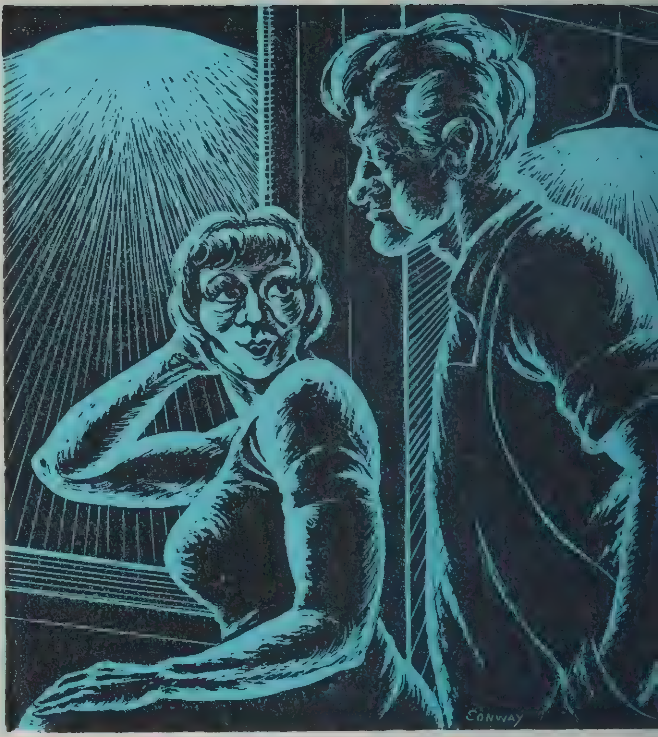
NOSEY'S LOVE LIFE

As far as I know, nothing much has ever been said about the love life of Nosey Hill. Nosey was definitely not a woman-hater. Nosey, in fact, was something of a lady-killer.

I know. I was foreman of the finishing room where poor Bertha Bilgewater counted paper day after day, year in and year out. Believe it or not, but that was the name of Nosey's one-time sweetheart—Bertha Bilgewater

"Nosey, ain't it romant-nic," Bertha would coo, "that you make the paper while I sit on my little stool all day and count!"

The undoing of Bertha's romance was that she couldn't keep her mind on her work. Instead of counting 4-8-12-16, Bertha would count: he-loves-me-he-loves-me-not. We had to let Bertha go, but Nosey took it like the man of the world he was.



"Ain't it romant-nic," cooed Bertha to Nosey.

The last we heard of Bertha Bilgewater, s polishing door knobs in a life insurance b at Splitlip, Nevada.

But folks still say that when they wer together there was no more touching sight see Bertha Bilgewater carrying a pail of Nosey Hill when he worked on the night

(To be continued)

THE SALES MANAGER of one of the country's biggest paper mills played host recently to a group of book designers and manufacturing men from a dozen publishing houses. The food was excellent, the wine flowed freely, and when the sales manager arose to speak he was greeted with a salvo of applause.

"Fellows," he said with a catch in his voice, "just fifteen years ago today our mill received its very first paper order from a book publisher."

Somebody in the rear of the room caused a near-riot by hollering, "When are you going to fill it?"

From Bennett Cerf's Column
in the *Saturday Review of Literature.*

Probably you are using, or have seen, those good-looking and serviceable automobile seat covers made of the above material. This material is Callaway Fibre, woven from a dyed sulphate paper and then coated with a lacquer containing Hercules nitrocellulose. Any soil adhering to the lacquered surface of this durable material can be wiped off with a damp cloth. Callaway Fibre is obtainable in a wide variety of colors and patterns.

H. Stuart

This is an example of an embossed paper coated on a reverse roll coating machine with a lacquer containing Hercules nitrocellulose.

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WATERMARKS

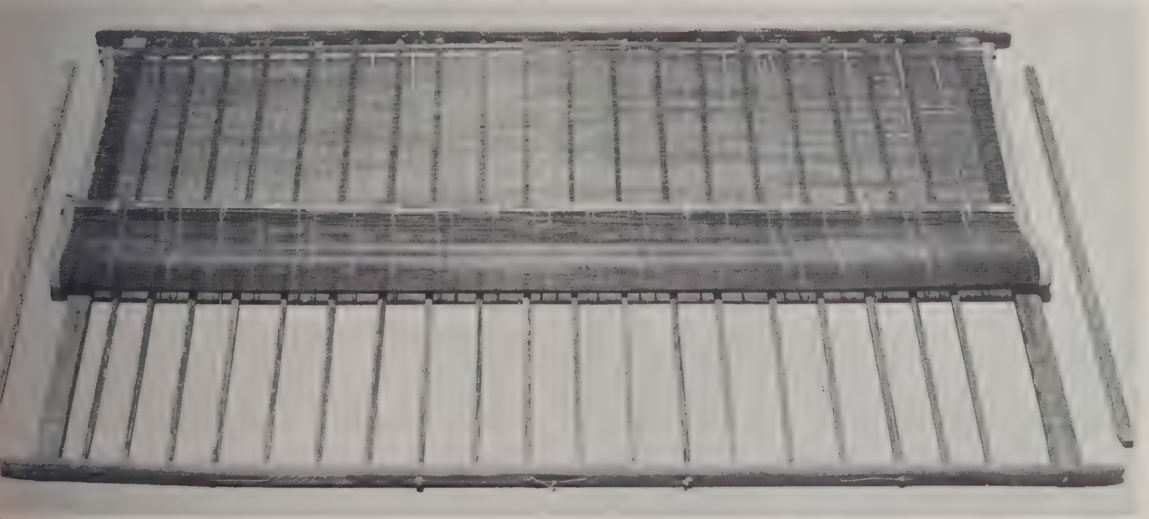
by

WILLIAM BOND WHEELWRIGHT

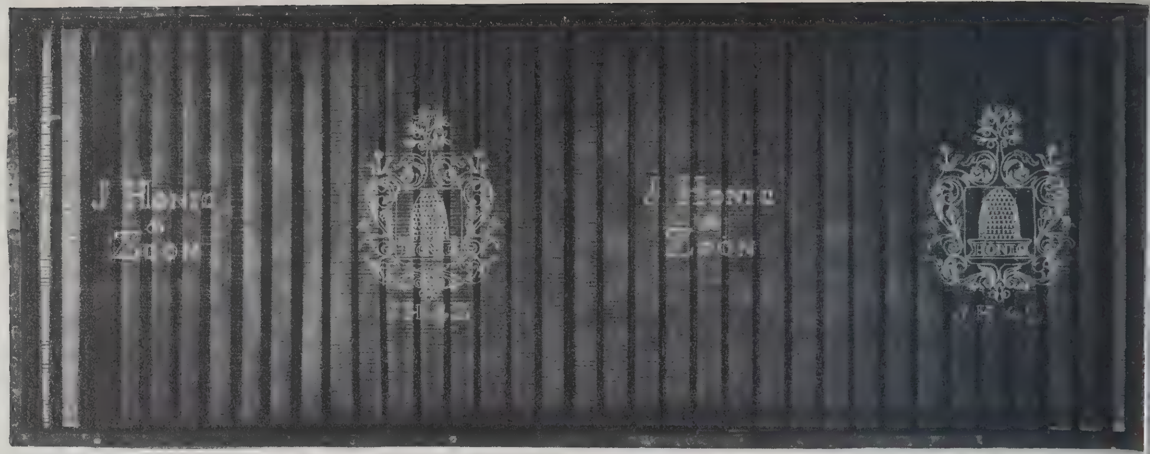
WATERMARK is a somewhat misleading term by which the translucent letters, ures, or emblems are made to appear in a sheet of per. To begin with, watermarks are not directly used by water. A drop of water, falling as it casionally does in the process of forming a sheet paper on a hand mold, creates a very different d characteristic effect. It is *really a watermark*, in e form of a slightly translucent blot. The term 'apermark," infrequently used as a synonym, uld be more applicable, both to ancient and dern "watermarks."

The former is the natural result of the deposit of ers upon the top of the mold, as the water in ich they had been suspended drains through the mold covering. The latter is nothing more than imprints, artificially produced from wire devices attached to the circumference of the dandy roll of a fourdrinier machine, or from rubber plates mounted on rollers which impinge upon the web of paper as it passes over a press roll.

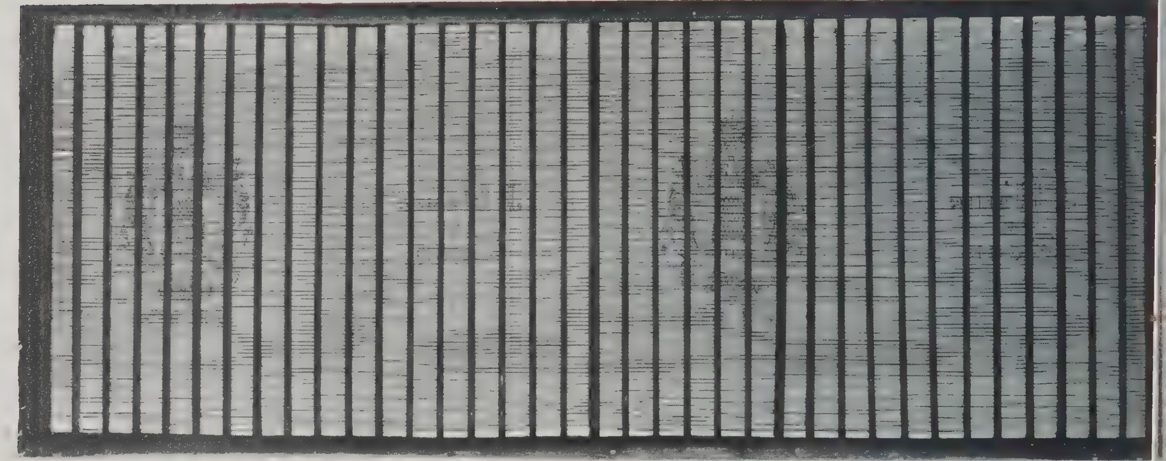
So-called "laid papers" are actually over-all watermarked patterns, reflecting either the structure of a hand mold, or of a dandy roll, as the case may be. If special emblems are desired, they are produced by attaching a wire design, either to the surface of a mold or of a dandy roll. This causes a thinning of the fibers, thus increasing the translucence of the paper in definition of the chosen design. The earliest papers, made in the Orient,



A flexible type of mold used in China. The laid lines are formed of bamboo and the chain lines of horsehair. The deckle sticks are shown at each side of the mold. This type of mold has been used in China since the second century and is still the most common type employed there.



Above is the obverse side of a double mold of J. Honig and Son, Holland, with their Beehive watermark. Below is shown the reverse side of the same mold.



were not watermarked. The bamboo molds, while showing "laid marks" in the sheet, did not lend themselves to the attachment of applied designs.

Watermarking, at least, was a European invention. It came about as a result of the Occidental molds' being formed from wires, rather than from bamboo, and also from their rigid construction which permitted the attachment of devices formed in wire to their surface.

No one can say by whom or how the art of watermarking was invented. It might easily have sprung from the accidental displacement of one of the fine wires of a mold, which automatically produced a "watermark," thus giving the hint to some ingenious papermaker, upon which he acted to produce markings deliberately. The very simplicity of design in the earlier watermarks lends strength to this theory.

The first extensive study of watermarks in general was painstakingly pursued by C. M. Briquet, wl se *Dictionary of Watermarks*[1] was published at Ge ra in 1907. "In the course of forty years," states J. Labarre, "he visited over 200 state and munic al archives and traced the watermarks and also e laid lines, etc., from earliest times to 1600 . Thanks to his records it is now possible, by m ns of close comparison of the laid lines, to state p- proximately the period and country in which, y, a sixteenth-century paper was made, and if the is a watermark proper, the mill or district in whi it was produced. His example has been followe by others who have made large collections of w er- marked papers . . . for the sake of the histo cal evidence they provide."[2]

Hope had been entertained that the exter ve study of watermarks would prove to be defin ely helpful to bibliographers in determining the te of paper, books, and prints, but this exp ta has not been fully realized. As Dr. Dard ter points out, "Few of the early watermarks dates, and even when they do, the date of the k must not be accepted as the time of the ting on the paper . . . Also a dated mold might e been used for many years with the same date, papermaker not troubling to change the res." Hunter even questions the evidence watermark as proof where the paper was le, or at what partic- mill. In the olden s, before the exist- e of patent or copy- t laws, there was hing to prevent de- ive imitation. In- d it is well known t as late as the nteenth century, un- pulous Continental ermakers sometimes licated the water- k of the celebrated atman mill.

A vatman forming a sheet of paper in an English mill.

From an archaeo- ical and artistic ndpoint," adds Hun- "watermarks are of t interest, but for ing *definitely* the dates paper, or the exact lities of certain mills, the marks should not be ed upon implicitly." The student of watermarks also learn to recognize the papers made before year 1800 from those made subsequently, from ervations of the "laid lines" and "chain lines," approximate the time of making from the eral character of the devices employed, as will explained.

he so-called "chain lines," in the elder days, e laced or sewed directly to the wooden ribs of mold at regular intervals, which varied from -half inch to as much as two inches apart in erent molds. This construction caused pulp to thicker along each side of the "chain line," ing a noticeably shaded effect, characteristic of real "antique laid" paper.

his effect was eliminated after the construction altered by means of wires running parallel with under the "laid" wires, so as to hold the ering away from the wooden ribs of the mold. This gives a much more even "look-through" to a sheet held up against the light, and will at least identify the date of making as having been later than about the year 1800. The adoption of a wove covering as a refinement to produce a surface smoother than laid paper occurred about 1750. Before that time all European paper was "laid." A "wove" paper may, therefore, be definitely identified as having been made after this year.

The spacing of the laid lines varies without regard to the period in which the paper was made, or the location of the mill. Molds having as few as 20 laid lines to the inch, and as many as 38, seem to have been made according to the whim of the papermaker at various periods and places. Hunter declares there is no possible way of cataloging or indexing these impressions so that a particular time or place of origin may be determined. "Ancient paper, both Oriental and Occidental," he concludes, "must be placed by its general characteristics and not by any list of rules that can be given as infallible."[8]

The original purpose of watermarks is a matter of some conjecture. Some cling to the mystical hypothesis of Harold Bayley, who connects their symbolism with that of the early printers' marks. E. J. Labarre, a devoted student of *paperiana*, maintains that it is now generally accepted that they were employed as trade-marks, "indicating either the quality, size, or maker of a particular sheet." Dard Hunter, commenting upon the mystical hypothesis, remarks, "This seems really more probable than to try to account for the multitude of watermarked designs as marks of identification for paper sizes or as trade-marks of the makers." But he adds, "It is not entirely out of the way to suggest that the old watermarks were, perhaps, nothing more than a mere fancy with the papermakers, who may have formed the designs

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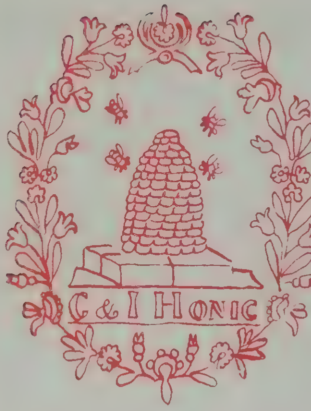

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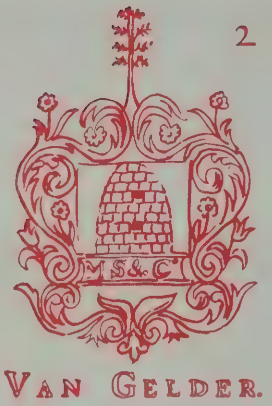

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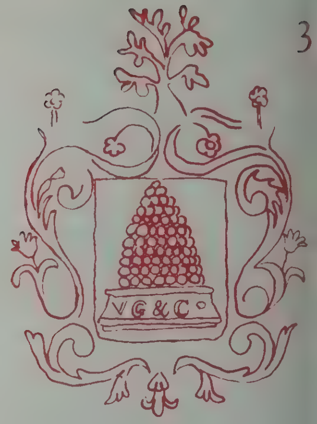

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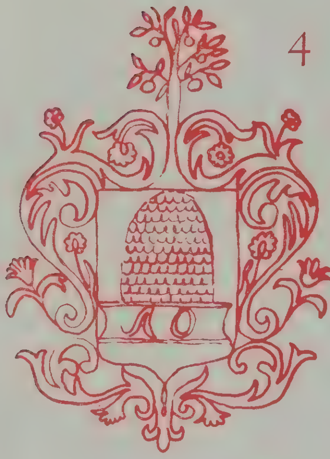

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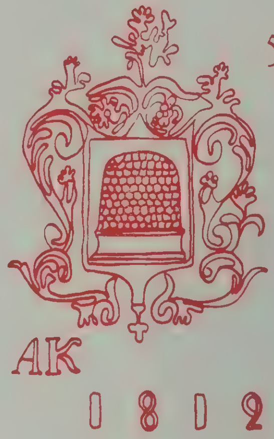

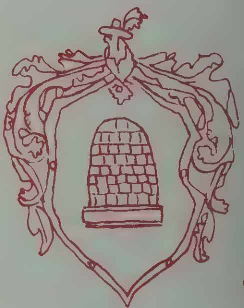

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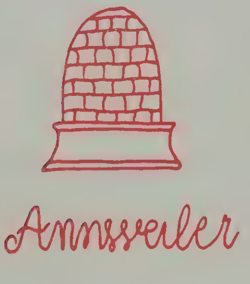

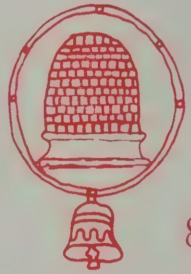

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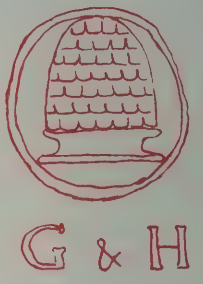

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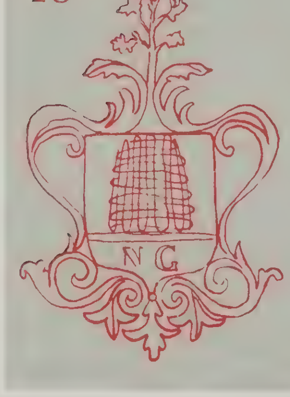

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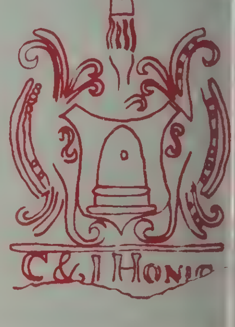

Early forms of the Beehive watermark: No. 1 is a genuine Honig watermark; the others are imitations by other papermakers. This illustrates the difficulty of accurately interpreting watermarks or identifying their makers. 2. Early Dutch imitation by Van Gelder with the initials of their original firm, Maarten Schouten & Co. 3. A later imitation by the same firm. 4. A French imitation of 1798. 5. Imitation found in Russian paper, 1812. 6. Swedish imitation of 1825. 7. German imitation, stripped of decoration. 8. Danish imitation. 9. Unidentified imitation. 10. Imitation only faintly resembling the Beehive. 11. Another foreign imitation, even to the firm's name.

ems to satisfy their own artistic natures."[3]
time came, however, when, as Hunter
out, "Such marks as foolscap, hand, post,
nd others did denote sizes of paper, but
ppellations were not used as size names
any years after the establishment of these
ılar emblems as
marks; more-
here were many
sing the same de-
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s."

rst-known water-
curred in Italian
out the year 1282.
g the fifteenth
y, watermark-
came general.
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l the latter part
eighteenth cen-
states Hunter,
termarks may be
into four divi-
The first of these
would embrace
arliest known
arks, which ap-
in the form of
ovals, circles,
triangles, three-
nbols, and devices
simplest kind
ould have been
twisted in wire
ne papermarks of
t group were in use
the origin of the
il the first quarter
fifteenth century.

e second division of papermarks would in-
man and the works of man and in the latter
ve find the greatest number of subjects, ex-
g into thousands upon thousands of designs.

e third group or division would embrace
marks as flowers, trees, leaves, vegetables,
plants, and fruit . . .

e fourth and probably the most interesting
of watermarks would include wild, domesti-
and legendary animals, as well as snakes,
snails, turtles, crabs, scorpions, and all
es of insects."[4]

Equipment, attached at the press rolls, for producing imitation watermarks.

One of the most popular symbols was the bull's head, which, by an interesting evolution at the beginning of the sixteenth century, gradually developed into a shieldlike scroll, which is illustrated as late as 1690 in the watermark of our own William Rittenhouse.

The employment of emblems of religious significance persisted into the times when there can be little doubt the watermark was really used as a trade-mark, in which traditional designs were adopted according to the personal taste of the individual papermaker. But in the case of the more ancient handmade papers, the classification of designs as outlined will be found of some assistance in determining the approximate period in which a given sheet of paper was made.

The detection of fraudulent works has also been discovered, thanks to a knowledge of watermarks. As is pointed out in *How to Collect Books*, by J. Herbert Slater, "The reason why paper and its various qualities and kinds and the watermarks upon it are regarded with interest is because it is possible in many cases to detect imitations by reference to the peculiarities observable in them. It is said that the watermark is a terror to the forger, though this view is perhaps too sanguine, for only in some cases can a limit of time be fixed by its use. Paper made in one generation may be kept back till the next, or for even longer periods still; in fact, old paper, either in sheets or made up into book form, and in each instance unwritten upon, is not infrequently met with. It is, however, an undoubted fact that old papers cannot be imitated with sufficient closeness to deceive the experienced eye . . . The utmost we can venture to say is that a study of paper and the marks upon it is important, as it may afford information as to where and when a book, without place or date, was printed, and may also prove useful in the detection of ignorant forgeries or unauthorized issues."[5]

Since the advent of the paper machine, watermarking has become an artificial process unrelated to the actual formation of the paper. The clarity of watermarks produced under the impression of a dandy roll is dependent both upon the length of fiber and the speed of the machine. To achieve the utmost in clarity calls for a short fiber, at some sacrifice of strength and a limitation in the speed at which the machine may be run. Such watermarks are of value to the consumer who wishes to be assured of the identity of the manufacturer. They are trade-marks and little more, generally displaying very little decorative or artistic taste. In eyes of the layman they may, like artificial de edges, add a value which is spurious. They are generally employed in rag-content writing bond papers, and to some extent in book, or papers.

The papermarks in sulphite bonds and led are generally produced by marking equip attached at the press rolls, and are distinguish from other "watermarks" by the sharper im sion, quite visible upon the surface of the p They are useful to the consumer to identify manufacturer and to indicate that the quali either No. 1, or No. 2, in accordance with established trade practice.

It must be recognized that watermarking, true function of the art of papermaking, is restr to hand- and mold-made papers.

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[1] Briquet, C. M., *Les Filigranes*, *Dict. Historique du Papier*.

[2] Labarre, E. J., *A Dictionary of Paper and Papermaking Terms*, Amsterdam, 1937.

[3] Hunter, Dard, *Papermaking*, New York, Alfred A. Knopf, 1943.

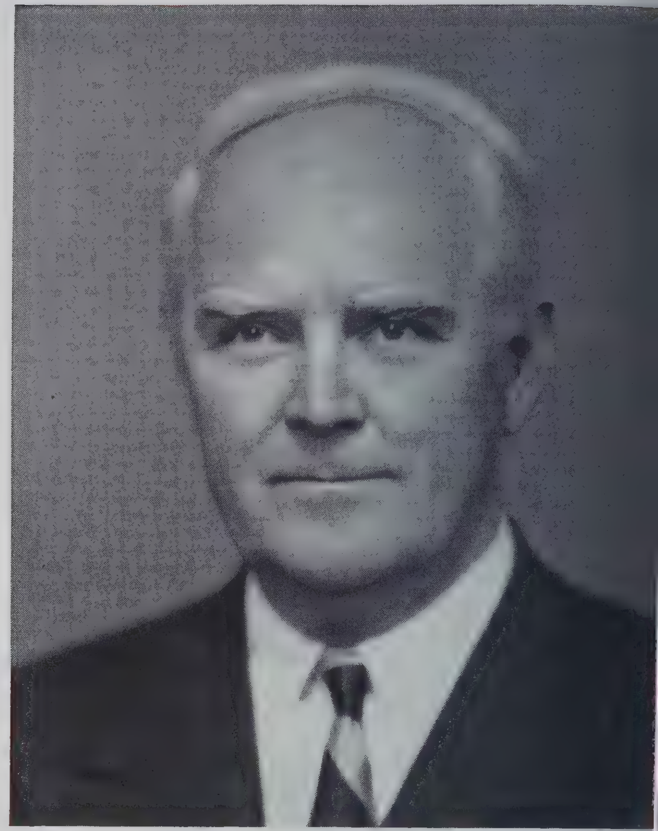
[4] Hunter, Dard, *Papermaking Through Eighteen Centuries*, New York, 1930.

[5] Slater, J. Herbert, *How to Collect Books*, London, Georg & Sons, 1905.

Illustrations are by courtesy of Dr. Dard Hunter; E. J. La J. B. Green and Son, Maidstone, England; and Nekoosa Fo and Machine Works, Inc.

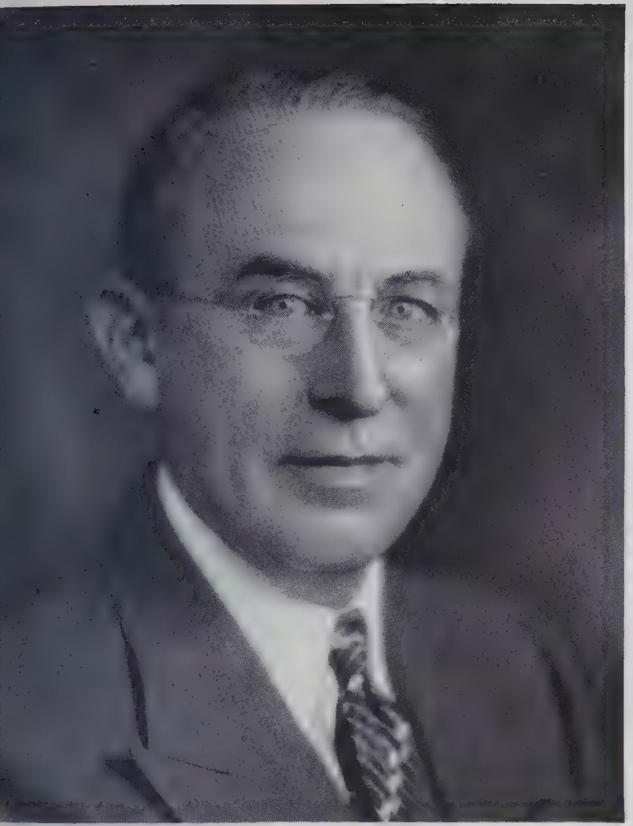
A keen student of handmade papers, William B. Beatty of San Francisco recently arranged a most interesting display of paper in Lawrence's Bookshop in that same city. It is pleasing to learn that copies of The Paper Maker were included in this exhibit, two views of which are shown on this page.

Mr. Beatty will be remembered by readers of The Paper Maker as the reviewer, in our last issue, of Dr. von Hagen's book *The Aztec and Maya Papermakers.*



REUBEN B.
ROBERTSON

TO REUBEN B. ROBERTSON—for his executive guidance of a prominent pulp and papermal
enterprise which operates three mills—one in the Miami Valley of Ohio, another in the Sm
Mountains of North Carolina, and the third in the coastal region of the Lone-Star State—with a c
bined daily production capacity of about 1,200 tons of paper and paperboard (coated and unco
book, label, offset, post card, cover, and other associated fourdrinier and cylinder specialties), 900
of bleached sulphate pulp, 160 tons of soda pulp, 80 tons of de-inked pulp, and 80 tons of groundv
pulp, he having served first the mill in North Carolina (operating as a separate company of the pa
organization) as general manager from 1912 to 1918, as vice president from 1918 to 1925, as presi
from 1925 to 1935, and then as executive vice president of the combined operations in a new corp
structure from 1935 to 1946, and as president from 1946 to date; for his services as president o
American Paper and Pulp Association for two terms (1946-1948) and, thus, to the entire pulp and p
industry of this country; for his many other interests in business and elsewhere—interests that inc
or have included such widely divergent activities as president of a wholesale supply company, tru
of The Institute of Paper Chemistry, director of a bank, chairman of the Southern Conferenc
Human Relations in Industry, member of advisory board of the North Carolina Section of the R
struction Finance Corporation, local chairman of Community Chest, chairman of the board of tru
of a teachers' college, trustee of a university, member of the Business Advisory Council of the
Department of Commerce, member of Southern Appalachian Forest Research Council, member c
President's Labor Industry Conference (1941), member of National War Labor Board, trust
Committee for Economic Development, and director of National Association of Manufacturers
his church and fraternal affiliations as well as for his membership in several clubs, which rev
reverence for the spiritual as well as an interest in the mental and physical; for his well-founded f
education in the liberal arts and in law that gives breadth of vision to daily toil; and most of al
a kindliness and a courteousness of manner that has made "travel on life's common way" a
more pleasant experience for many.



NORMAN W.
WILSON

o NORMAN W. WILSON—for his forty-seven years of association with the pulp and
paper industry—he having been connected, since 1901, with the firm of which he is
president, starting with the firm when he was sixteen years old and becoming vice
dent in 1914, assistant general manager in 1919, first vice president and general
ger in 1929, and president in 1940 (a firm located in the city of his birth—a city on
Erie in the State of Pennsylvania); for his leadership of this well-known company
operates a 250-ton sulphite pulp mill and a 325-ton paper mill—the paper mill
ucing a wide variety of papers, including bond, Bristol, post card, offset, envelope,
ograph, ledger, safety, and plastic-coated and impregnating papers; for his other
ess interests within and without the paper industry—president of a Pacific Coast
ern which operates a 75-ton paper mill, producing a line of sulphite specialties;
tor of a Pacific Coast firm which is a large and well-known producer of dissolving
and other grades of sulphite pulp; director of a New England envelope-producing
director of a leading bank in his home city; for his numerous association activities,
aving been president of the American Paper and Pulp Association for the year 1926-
, member of the Import Committee of the Paper Industry since 1924, as well as
ntly being regional director of the United States Pulp Producers Association; for his
ous, educational, civic, social, and humanitarian interests—as evidenced by his affilia-
with the church of his choice, trusteeship in The Institute of Paper Chemistry, mem-
f the State Park and Harbor Commission of his state, member of the Board of Cor-
ors of two hospitals in his home city, membership in several social and professional
; and particularly for his steadfast determination to make a place for him-
in the world, he having completed his formal education, following graduation
high school, through correspondence instruction—good evidence of "The will to
he soul to dare."

The Romantic Phase of

With Something of Their Significance as Symbols

by Harrison Elliott

ith no intention of entering into the controversial, what is here attempted is to present an account of the more romantic phase of watermarking paper. Whether watermark designs were mere whims n the part of their creators, or that they held deeper meanings as conveyors of hidden messages, will be left certain exponents of the Baconian theory. However, in the exposition of their views, they gave much the original significance of watermarks as symbols or emblems. It was this phase of the subject that ad lacked treatment by writers on papermaking. They treated the subject of watermarks in a rather rosaic manner, without regard for the romantic.

Their meaning or significance, apart from being merely trade-marks or size notations, was first exounded to some extent by one Constance Mary Pott (1833-1915) in her book *Francis Bacon and His ecret Society* published in Chicago in 1891. A revised edition appeared twenty years later. In this book e many reproductions of watermarks. In stating her belief that Francis Bacon wrote the works attributed Shakespeare, Mrs. Pott maintained that watermarks were a part of a Baconian cipher, and gave much their significance as emblems.

Mrs. Pott took to task the author of *Paper and Paperm* *Ancient and Modern* (London, 1856) for his matter-of-fact tr on watermarks. The author of the book was Richard Herrin interesting to note that in the introduction by The Rev. Croly, L.L.D., the reverend gentleman has this to say of the of paper and its supplying the only material extensively ava for printing at its inception in Europe. "Whether this coinci was simply accidental, or was the effect of that high arrang for high purposes, which we so often find in the history of dence, may be left to the consideration of the Christian."

Mrs. Pott made a "discovery" of certain blemishes in which she designated as "moons." She declared, "The mo which allusion will be made, are not made, like the other marks, by wires. They give the idea of having been produ the impression of a thumb on the soft pulp in the process of making. These moonmarks are of too frequent occurren certain books and during a certain period, for any doubt to as to their being the result of intention and not of accid chance."

Had Mrs. Pott been as diligent in the study of papermak she was in the search for mystical meanings, she would ha covered that the so-called moons were caused by drops of falling on the pulp while still in the hand mold in a very so moist state, thus forming little craters which appear as trans spots in the finished paper. Such drops can also fall on t pulp sheet when the wet deckle frame is lifted from the m when a bubble remains on the surface of the pulp while the is draining off. In reality, such blemishes are true waterm water, its mark.

The good lady also read into certain dots in watermark d something of a mystical character. But the dots were caused by sewing the wire design on the screen of the mol too coarse a wire. Where the sewing wire crossed the desig it left deeper depressions in the pulp. These depressions ap as dots at intervals in the design and were more translucen the regular design when the finished paper was held up to t to expose the watermark. Mrs. Pott held that their numb position conveyed a message.

This account is in no way to be construed as an attempt count the exhaustive work of Mrs. Pott in the statement views. She was a most indefatigable worker for her cause. Ig Donnelly in *The Great Cryptogram* (1888) has a biogr sketch of the industrious lady. It concludes with this enco "Mrs. Pott is one of the most comprehensive and pene minds ever born on English soil, and her nation will yet rec her as such; and she is withal, a generous, modest and unpr ing lady."

The pot watermark in its finest form should have grac lady's stationery, and would have been a good exampl punning watermark with real significance. It is an honor as one who gave to these shadowy forms the color of roma

Another cryptographer was Harold Bayley with his two *A New Light on the Renaissance* (1909) and *The Lost Lang* *Symbolism* (1912). The books were preceded by magazine by the same author, on the subject of watermarks in pap their hidden meanings as a system of secret communi Bayley claimed that, "Independent researches upon wh many years I have been engaged enable me to say with ce that behind the obvious trade purpose served by watermark lies buried one of the most extraordinary romances ever sus bliography. In brief, watermarks are *emblems*, imperishable ht-crystals in which lie enshrined the traditions and aspira- of many generations of papermakers. It further follows that ect reading of these emblems throws an unexpected light on therto obscure history of early papermaking, and incidental- on many of the dark pages of medieval history."

ley went so far as to say, "It seems to have been a happy ht on the part of the papermakers to flash signals of hope ncouragement to their fellow exiles in far-distant countries, g at the same time as an incentive to faith and godliness in selves."

cient watermarks are an interesting record of medieval es of utility and ornament. Among the designs were many ge devices, pagan symbols of mythical origin, and many ems of a religious nature.

vas, no doubt, the belief of the medieval papermakers that, from the use of a particular design as a trade-mark or a mark ntification denoting the type or size of paper, an artistically ted device would attract attention because of its ornamental , and, as such, exploit to some extent a certain make of paper.

emost as a collector of watermarks was Charles Moise et (1839-1918), whose collection at one time consisted of) examples. Briquet's *magnum opus*, consisting of four nes, first published in Paris in 1907 and later in Leipzig in contained 16,112 examples of watermarks that made their rance between the years 1282 and 1600. Briquet's was a r-of-fact treatment of the subject, and in 1910 there ap- d his pamphlet in disapproval of the romantic views of d Bayley.

e illustrations accompanying this article were traced from ductions in Briquet's four-volume work and show early forms presentative watermarks. They were emblems that were r generally used, with modifications and variations.

earlier writer on the subject of watermarks was S. L. by. His treatise appeared in the third volume of *Principia graphica* published in 1856. Sotheby held that watermarks chosen to some extent according to the nature of the books ich they appeared. This was not borne out by the many ent designs found in the same book; their number, no doubt, d by paper shortage forcing the printer to combine a number ferent makes of paper. Sotheby's idea carried out in a natural ry would give us a veritable watermark zoo.

nple geometrical designs such as crosses and circles, often ined, were the first symbols used as watermarks. The Cross, nost universal of all symbols, appeared later in many forms than its Christian meaning. It has been called the cosmic ol of the four quarters of the earth, or the four cardinal s, and the four winds. Entwined by a serpent, it typified ual rebirth.

e Circle symbolized water, eternity, and was the emblem of rsality or omnipresence; three circles, the symbol of the ty.

e Trefoil (clover leaf) was regarded as an emblem of the . It is a device of more ancient origin than Christianity. As ods were worshipped in triads and the three-fold aspect of ecognized in all its significance, the trefoil became a natural em of high importance and a widely accepted symbol of ty.

The Pot, Tankard, or Libation Vase as a watermark de
first appeared in the fourteenth century. The figure was supp
to represent either a sacramental chalice or a flagon, the
sacred and mystical object of Christian faith. It was the p
hold "the liquor of knowledge." The papermakers elaborated
as suited their artistic fancy.

Somewhat akin to the chalice in religious aspect was the f
4. It was held sacred as the emblem of moral justice and d
equity. It occurred frequently as part of the design, a no
instance being that of Benjamin Franklin's own watermar
signified the four elements, the four seasons, and the universe

The Horn watermark was originally the Horn of Rolan
hunting horn. It was corrupted into the so-called post horn.
the emblem had its inception long before the postage wa
stituted. Biblically, it is considered a symbol of strength, p
glory, or pride.

Scales as a watermark device were commonly used as
symbol of eternal equilibrium necessary to a universe of har
and exact justice.

The Anchor was symbolic of slowness and steadfastness
emblem of Christ as a refuge and an ever-present help in tro
Aldus, whose printer's mark was a dolphin and anchor, said
"I have as my constant companion the dolphin and the anc
have accomplished much by holding fast and much by pre
on." The dolphin and anchor combined suggested the cauti
make haste slowly. In Joseph Conrad's *The Mirror of the Se*
discourse on the anchor is entitled: *Emblems of Hope.*

The Fleur-de-Lis symbolized divinity, purity, and abund
The lily's three leaves in the arms of France signified
justice, and charity. As the Flower of Light in English, in its
use as a watermark, it was emblematic of the mental ligh
papermakers were the means of spreading.

To the Rose, which appeared in many forms as a water
was attributed secrecy which gave the expression, "*sub*
This flower was dedicated to the God of Silence, the embl
reserve and faithfulness.

The Hand watermark still survives in modern handmade p
The right hand has in all ages been deemed an important s
to represent the virtue of fidelity—"the right hand of good f
ship." It is likewise the emblem of labor. The third and f
fingers bent downward, the sign of benediction, denoted
fealty, allegiance, and alliance, pre-eminently a symbol of
given and kept.

The Dove, in its many watermark forms was emblema
peace, and, as such, bore in its beak an olive branch. It
appeared without the olive branch, perhaps so in warlike ti
The Eagle had many variations, and stood for royalty, p
authority, and victory—the emblem of soaring thoughts an
bird of light.

The Phoenix was a much-used symbol in watermarking. I
significant of the resurrection, and was mythically supposed
reborn out of its own funeral pyre. It surmounts, rather im
sively, George Washington's own watermark.

The Bull- or Oxhead was a favorite device with the p
makers. It flourished in many varieties of size and arrangem
the fourteenth and fifteenth centuries. Some of the 1500 va
of this device which appeared before the year 1600 were w
without eyes, with horns in many degrees of curvature, w
Greek cross growing out of the tip of its head, or with Mer
rod entwined with a serpent and terminated with various sy

as the triangle, figure 4, the rose, the fleur-de-lis, or the ese cross. It was the symbol of patience and strength, and :egarded as emblematic of all those who bore the yoke and ed for the good of others.

e Unicorn figured largely in watermark design. Briquet cted some 1133 examples which included many variations ome very ludicrous examples. It was regarded as the symbol oral purity and of unity and strength.

e Stag was considered somewhat akin to the unicorn, being ematic of solitude and purity of life, and sometimes coned as the symbol of eternity.

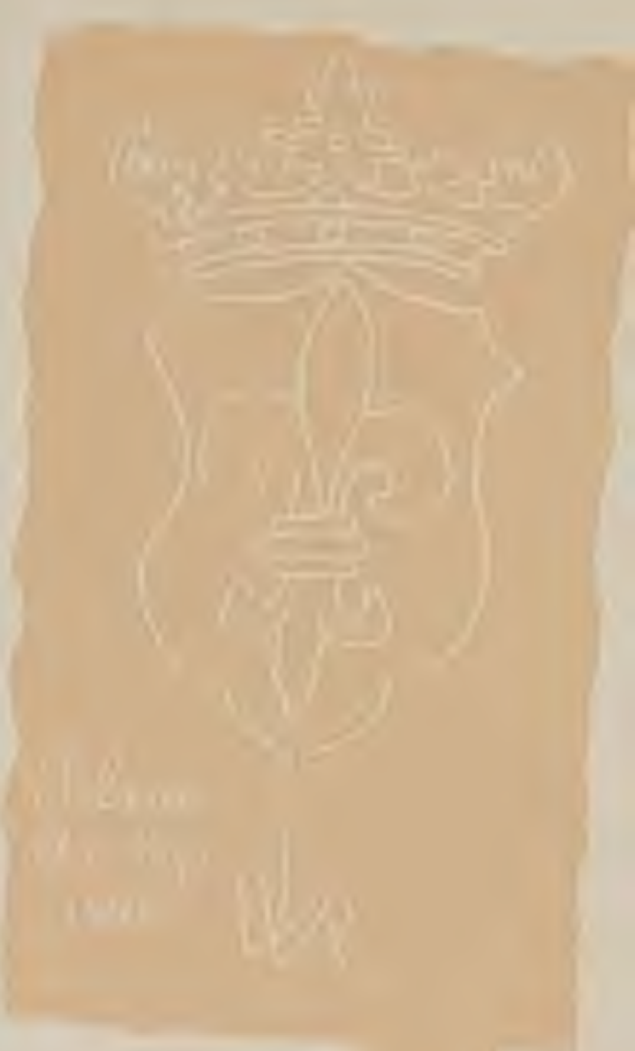
e familiar Fool's Cap had many variations and made an early arance as a watermark in some paper used by Caxton for his ing of *The Golden Legend* in 1483. In its many forms, it was ded as the symbol of "The infinite jest." And as Shakespeare t: "The fool doth think he is wise, but the wise man knows elf to be a fool." It, of course, gave the name to a folio size and the fool's-cap watermark was used in paper made by Sir Spielman, the Kentish papermaker, who was granted a rmaking monopoly during the reign of Queen Elizabeth. es of the first folio Shakespeare (1623) contain paper with ool's-cap watermark.

re, however flexible, is not the most tractable material and ts limitations as an art medium. But this working of a somerestrictive material into various and often intricate forms of n is a distinct style of art, and in its final effect is an art in, r than on, paper.

accidental disturbance or long-continued use of a hand mold ently caused a dislocation of the watermark wires and a equent distortion of the design and unintentional variations. so accounts for some of the watermarks being poorly prooned. The surviving examples of the more artistic antique rmarks show how designs have been developed, and later nore skillful handling enabled them to be executed with more ty. This is best exemplified in those occurring in the fine made papers.

the latter-day use of watermarks, in many instances, they little or no significance apart from their being ornamental. y of the devices are used with little variation by many of the ern papermakers. This is especially true among the "hande" papermakers who make much use of the crown and fleur- motifs and combine many of the old devices in one design. though the term "watermark" has become sanctioned by non usage, it has been questioned whether it is an apt bit of inology. "Paper marks," "wire marks," and "light marks" been used, and each has its justification. The term "light s," though seldom used, would seem to have a fitness, inas- as the effect produced by the pulp working thinner over the tracery of the design causes the paper to be more translucent the design, thus allowing the light to come through more y there when the sheet is held up to the light.

hether the designs here reproduced were used more for their mental value, or with a knowledge of their symbolic meaning, be left to speculation. It can also be made a matter of inting research. Although the accompanying designs and ces were in use prior to the year 1600, they show an advance ctorial treatment from the earlier simple geometrical designs. of the more commonly used devices have survived; others long since disappeared. Occasionally one of the old waters is faithfully reproduced to impart to modern handmade r a suggestion of the antique.



THE MARKS OF MAN

They are immutable evidence of his existence.
Charged with vehemence of conviction they communicate man's purpose in tangible form.
They impress identity on the stuff of life and endow it with character.
Wondrous is the working of man's will . . . molding stolid matter into eloquent creations.
It is for each to make his self a contoured character, an original type, that expands life's meaning.
Signatures on noble handiwork enhance their distinction.
Achievement by achievement a name acquires permanence, defies oblivion.
The marks of man need not be material. They can be represented in the impress of a whispered word . . . in a tremulous touch . . . the contact of a caress . . . these form indelible impressions that endure in the soul.
Time holds man's worthy works to the light, and through them shines the spirit of their maker.
Let there be more marks of man . . . marks that give lucid direction to ideals . . . lead the way . . . make it a joy to travel.

—P. K. THOMAJAN.

CMC

(SODIUM CARBOXYMETHYLCELLULOSE)

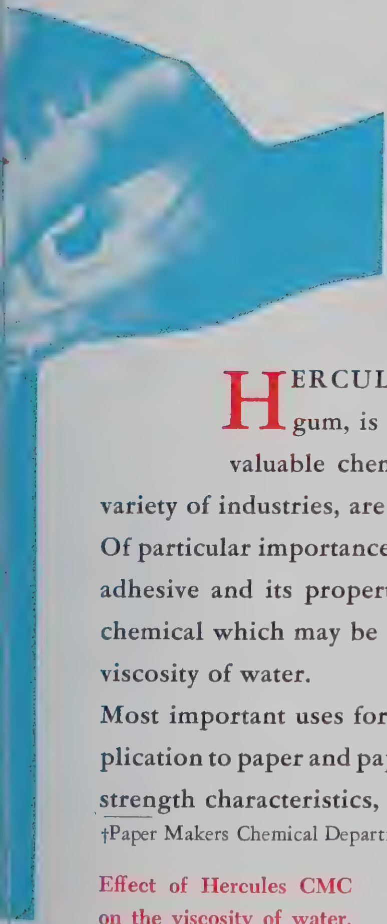
IN THE PAPER INDUSTRY

By HENRY F. HELLER[†]

HERCULES* CMC (sodium carboxymethylcellulose) cellulose gum, is a relatively new product in the paper industry. Its many valuable chemical properties, which are making it useful in a wide variety of industries, are also being found applicable in the paper industry.

Of particular importance to the paper industry are the ability of CMC to act as an adhesive and its property of grease resistance. Other properties of this versatile chemical which may be of interest to the paper industry include its effect on the viscosity of water.

Most important uses for Hercules CMC in the paper industry involve surface application to paper and paperboard for two major purposes: (1) to obtain increased strength characteristics, and (2) to achieve various degrees of grease resistance.



Effect of Hercules CMC on the viscosity of water.

[†] Paper Makers Chemical Department, Hercules Powder Company

Hercules CMC is a white, granular, free-flowing powder of uniformly high purity.

STRENGTH IMPROVEMENT

Experience derived from numerous mill trials, as well as from results of continued commercial applications, indicates that calender-applied CMC is capable of producing 5 to 20 per cent increases in Mullen and tensile strength, on board ranging from 9 to 30 points in caliper and produced from furnishes consisting primarily of waste papers and ground wood and/or deciduous pulps. The average increase in Mullen and tensile strength has been in a range of 10 to 12 per cent. Greater strength increases were obtained with paperboard of low normal strength.

A relatively recent development in the use of CMC has been the replacement of animal glue applied for the purpose of improving the strength and imparting the desired finish, feel, snap, and rattle to rag-content bond and ledger papers. Data covering this use are not yet sufficiently extensive to prove definitely the commercial value of s applications, but preliminary results are interes enough to merit mention and further trial.

Strength improvement also was noted in nection with trials of CMC for surface treatmer drinking-cup stock for the purpose of reducing consumption. This test involved the two-side plication of a 2 per cent solution of CMC by m of two calender boxes. By reducing jordanin increase fiber length, the tear test was increase per cent without detriment to Mullen stren The CMC treatment not only offset the los Mullen strength which would normally r from decreased fiber treatment, but also produc sixfold increase in Densometer test.

Besides the improved Mullen and tensile ch teristics, other improved board properties obta by surface application of Hercules CMC to and paperboard include increased stiffness, sm ness, gloss, improved feel, decreased fuzziness

Hercules CMC was applied to the surface of this paperboard before printing with glossy inks. Treatment with Hercules CMC enables inks to print with a maximum high and uniform gloss, because a minimum of ink is absorbed by the paper; therefore, less ink is used in printing. Another advantage is the reduced frequency of press cleanup. Greater press speeds can be obtained when printing on CMC-surfaced stock, and the CMC treatment prevents discoloration from varnish overprinting. Other advantages are outlined in the accompanying article, but, as explained, the results obtained depend upon the type of Hercules CMC used, the methods of application, and the characteristics of the stock being treated.

The Sales Division of our Paper Makers Chemical Department at Wilmington, Delaware, will be pleased to consult with you regarding advantages you may obtain from using Hercules CMC in the treatment of paper.

eased surface strength. All the properties tioned are not necessarily improved by a single C treatment technique, but the results described e been obtained repeatedly by the proper type MC surface application.

he exact type of CMC most effective for im- ving strength depends upon the available hods for application, as well as the characteris- of the board being treated.

GREASE RESISTANCE

early any desired degree of grease resistance, n that of the untreated rd to a degree approaching obtainable by laminating h glassine, can be obtained ough suitable application Hercules CMC. The degree grease resistance on the emely high end of the ge cannot be achieved by ns of calender boxes alone, requires a subsequent in- endent coating operation. r many grease-resistant lications, however, calen- applied CMC is entirely factory. For example, ex- nt gloss ink printing lts are being obtained on rboard treated with 0.03 .05 lb. of CMC per 1,000 re feet of surface. By ap- ation of as little as 0.05 f CMC per 1,000 square of exposed surface, the ffin wax pickup of a ed container has been eased as much as 25 per . Another application of pound of CMC per 1,000 re feet of exposed surface ced wax pickup by 45 ent.

s another example, a lar CMC treatment has eased the resistance to ffin oil penetration from seconds for the untreated board to 9,000 seconds for the CMC-treated equivalent. The grease-resistant CMC films can be plasticized to withstand a high degree of flexing by use of glycerin, for example, without loss in grease-resistant properties.

Hercules' experience indicates that more effective grease resistance is obtained by multicoat treatment than by single-coat applications, even when the total applied weight of CMC remains constant.

The added resistance to penetration of oils and waxes in paper and paperboard has been utilized for saving wax and improving the appearance of

Flow of a CMC-water solution of low concentration. Taken at 1/30,000 second.

waxed paper products, for the production of grease-resistant containers, and for improved-quality gloss ink printing.

The exact type of CMC most effective for any given application is dependent upon a complex set of factors including the degree of treatment desired; the furnish, sizing, density, and finish of the sheet to be treated; the equipment available for applying CMC; the speed of operation; and probably a number of other factors as well. However, as a result of extensive experience with CMC applications, Hercules is usually able to recommend a viscosity type and method of application which are fairly near the optimum with knowledge only of the result desired, the type of paper or board, and the equipment available for applying CMC.

Extensive studies by qualified laboratories have indicated that purified-food grade type CMC is physiologically inert, and, therefore, suitable for
incorporation into foods and pharmaceutica
arations designed for human consumption
result, CMC is finding wide use in the food, p
ceutical, and cosmetic industries. All H
CMC, as, for instance, the type used for
treatment of milk containers, is of one and th
high-purity quality. The CMC used in f
certified as required by law.

Another factor which enhances the
Hercules CMC is its extremely low salt c
This factor makes its use particularly de
from the standpoint of corrosion which
encountered when materials having a high
lyte content are used.

Hercules CMC for the paper industry is
flowing, white, granular powder. It is avail
six different viscosity types ranging from 2
poises as determined on a 2 per cent water s
to 4,000 centipoises for a 1 per cent water so

THE ADVENTURES OF NOSEY HILL

PART TWO

ILLUSTRATIONS BY IRWIN G. CONWAY

THE EQUATOR MILL

osey Hill once worked in a mill down near the tor. This mill was located next to a river, the e of which, or its exact place on the map, y would never tell.

his unusual mill had a double set of water nes—one for water running south, the other vater running north. Between the two tur- were two sets of heavy friction clutches.

midnight it was very important for the aine tender to be on duty at these clutches. n the river changed its run from south to h, the machine er would yank one h out and throw ther one in. Only oing this could the machine be kept ing in the right ction.

ell, as you know, sy was never one to turn down a few hours' sleep, especially on the night shift, when everything seemed like a good, easy run. This particular night seemed like a good, easy run. Nosey told his backtender to change the reel, watch the wet end now and then, and to be sure to wake Nosey up in time to switch the clutches at midnight.

It's too bad. One thing Nosey just couldn't seem to learn was that any time a machine tender falls asleep the backtender just naturally falls asleep, too.

When Nosey awoke, the machine was still running, but something, to put it lightly, was definitely wrong—for there piled high on the screen was the last hour's run of paper. Nosey looked at his watch. One o'clock in the morning. No one had shifted the clutches, and Nosey knew then that the machine had

Most of the Nosey Hill stories in this collection are taken from *Superior Facts,* which was a house organ of Paper Makers Chemical Corporation, edited by the late Ralph M. Snell. The contributors are listed as follows: Big Sez, Casper Grathwohl, Bing Sez, Richard Casper, Alec C. Duncan, Thomas L. Snell, Davie Fleming, D. M. Kelly, Cyrus Frye, George Bonner, Eugene Hibbard, William Stone.

Not appearing in *Superior Facts* are two additional contributors: Jim Tolland, Tom McDonnell.

been running backwards ever since midnight.

Well, I tell you, Nosey just naturally beat that dumb backtender, and quit the next day.

NOSEY'S HOBO FEVER

One day Nosey Hill was riding a freight-box car, first class, when the train eased into a siding next to a paper mill in Massachusetts. The whir and whine of the Jordans made music in his ears. The smell of wet pulp was like the smell of fresh apple pie to a hungry hobo.

Nosey stormed the front office and demanded a job. He told the superintendent he owed it to himself to have someone like Nosey around the place.

"Well," said the superintendent, "I-humph-don't know-humph-if we have-humph-anything just now. But-humph-if you'll just-humph-leave your . . ."

Nosey shifted impatiently.

"Well, lookee here, Boss. You'd better make your mind up pretty quick. My train's a-waitin' outside."

A good part of Nosey Hill's life was spent riding the rails. He had the freight-train blues. He'd change from one paper mill to another, either leisurely or suddenly, according t nature of the situation at hand. Sometin left at the desperate insistence of the su tendent, the mill owners, the chief of polic mayor, the governor, the state militi Secretary of War, and some say there is e record an appeal from the President of the States.

This is hard to understand, for Nosey H a papermaker of exceptional skill. He was natured, and generally an invaluable m have working for you. They say it was ju he had such bad luck with his backtenders of course, and hobo fever.

THE SWALLOW'S NEST

Nosey Hill, looking for a job, came one a paper mill in Rochester, New York. Goi the mill, he found the machine room pil with broke. Come hell or high wat machine crew just couldn't keep paper machine.

Nosey, realizing he was needed at once the superintendent for a job.

"If you can stop that paper from bre said the super, "the job is yours!"

"O. K.," said Nosey, back in a minute."

Nosey left the mill, but returned with a 20-gauge under his arm. The boy pletely flabbergasted, away from the machine.

Nosey rushed up to end, aimed at the roof, a one deafening shot. A s nest splattered on the w cloud of feathers, stra other stuff.

The crew shut down chine, washed up, sta again, and had no more after that. Nosey got th

Nosey later said th lows are not particula what they do when all nest in a machine-room r he said, should be a l every papermaker.

. . . When the train eased into a siding next to a paper mill in Massachusetts.

THE NOTCHED STICK

a mill in Rochester, Nosey's crew noticed he kept a stick handy on each tour of duty. y so often he'd make a notch on the stick. n asked about this, Nosey explained that notch indicated a break on the machine. If ad more than twelve breaks in a night he ly quit and looked for another job.

ll, finally, as it must come to all men, there a bad night on the machine. The breaks ted close to twenty. y cut that stick un- was down to the f a toothpick. And he quit.

GOOD MEAL SPOILED

casionally, in my ng from mill to mill e early days of making, I teamed ith Nosey Hill.

e time Nosey, Red and I found our- up in Maine, where ig paper mills were built and ready to running. While ng for jobs at one mills, we ran pretty n ready cash. Every e we nearly landed a Red Tom killed it his loud mouth. He ouldn't seem to keep ht at the right time.

ally, Nosey suggested that we all play deaf umb. We were hard up for a good meal and on the prowl to get one. A farmhouse seemed y place to get a good meal. We picked out a erous-looking one, went to the back door, nocked. Luckily, only the farmer's wife was ne. We knew we could play on her motherly t. The sight of the three of us would have ed pity in the cruelest of hearts. Soon she heaping dinner on the table. Just then the himself came in, was told of the dreadful ion of the three wanderers, and we all sat with his blessing to eat the enormous meal. went well until the time came for tea. When the good wife indicated that she had tea coming, Nosey and I put on our looks of dumbness, plainly showing we didn't understand. But Red Tom was too damn busy eating to notice the pantomime. Turning suddenly to Red Tom, she asked:

"And are you deaf and dumb, too, my good man?" At which Red Tom blurts out:

"Sure, lady, I'm deaf and dumb."

As we disappeared over the nearest hill, we could hear the bang of the gun and the sound of buckshot whizzing over our heads.

We picked out a prosperous-looking one, went to the back door, and knocked.

THE RUNAWAY PAPER

Nosey Hill once worked in the tissue mill at Skaneateles. Well, it seems that Nosey had been down at Casey's Tavern. He'd been licking up beer, like a grizzly bear licks up honey. When he got to the mill for the night shift, Nosey was slightly crocked.

He called the backtender and said: "Say, Tommy, I've been doing a bit of legal business in town today and didn't get much sleep. You look after her tonight and I'll take a snooze. Now keep her humpin' or I'll knock yer block off." Nosey went back to the wet end, sat down on a box, and went to sleep.

He woke up a couple of times, saw the wire covered all right, the backtender leaning against the wall, and so he dozed off to sleep again.

Along about four in the morning, Nosey snored heavily and fell off the box. Suddenly awakened, he tought he'd take a look around. He found the wet end running fine, but when he got to the reel there was no paper! He let out a shriek, and looking up, saw the 10-pound tissue sheet disappearing up through the ventilator shaft. Going up on the roof, he found the night's run all over the roof and halfway down the alley.

Going up on the roof, he found the night's run all over the roof and halfway down the alley.

Well, Nosey just naturally beat hell out of the backtender, and quit.

NOSEY'S SUNDAY AFTERNOONS

I worked with the famous Nosey Hill when he was at Rochester. That was back in 1886. He lived then at a boarding house with several other papermakers. Because he had traveled so widely and had worked in so many mills, Nosey was always interesting to listen to. The way he could spin yarns about his experiences gave him popularity.

On Sundays in mild weather, Nosey spe day sleeping on the lawn outside the bo house. This he did much to the fretfulness landlady, who tried desperately to make hi derstand that such lounging on the Sabbat not considered the proper thing by the people of Rochester. Nosey, however, con to spend his Sundays in outdoor naps on th lawn.

THE ELUS SHEET

At one time Nos was night boss Neena Paper Co and worked under Thom, general su tendent.

There came oneo nights when prac no paper found it to the reel. Nothi break, break, bre night long. Even th Nosey Hill cou nothing about it.

Completing his Nosey started out mill when he met Thom.

"Well, Nose everything go we night?"

"Boss, everythin just fine. Why, you couldn't break that with a club."

After Nosey had left, Mr. Thom went i machine room and was astounded to see broke climbing up the walls. He made business to question Nosey about it on the ing night.

"I thought you said you couldn't bre paper with a club," said Mr. Thom, sternly.

"That's a fact, Boss. You couldn't beca damn paper wouldn't stay on the machi enough for anybody to take a crack at it club!"

THE BLISTER FIXER

sey Hill wandered down South one time and job there in a paper mill. The superintendent, g heard of the wondrous Nosey Hill before, ed with him to go to work at once, for they having a helluva time on one of the machines. e machine room was a papermaker's night-. There was so much broke in the place they to lower Nosey down through one of the ghts.

usual, it didn't take long for Nosey to dis- what caused all the trouble. It was a big blister under terrific pressure. Nosey ed a drier spear and pierced the blister. e who were there say that the blister broke such force that every man on the crew com-ed of a loud, ringing sensation in his ears for onths afterwards.

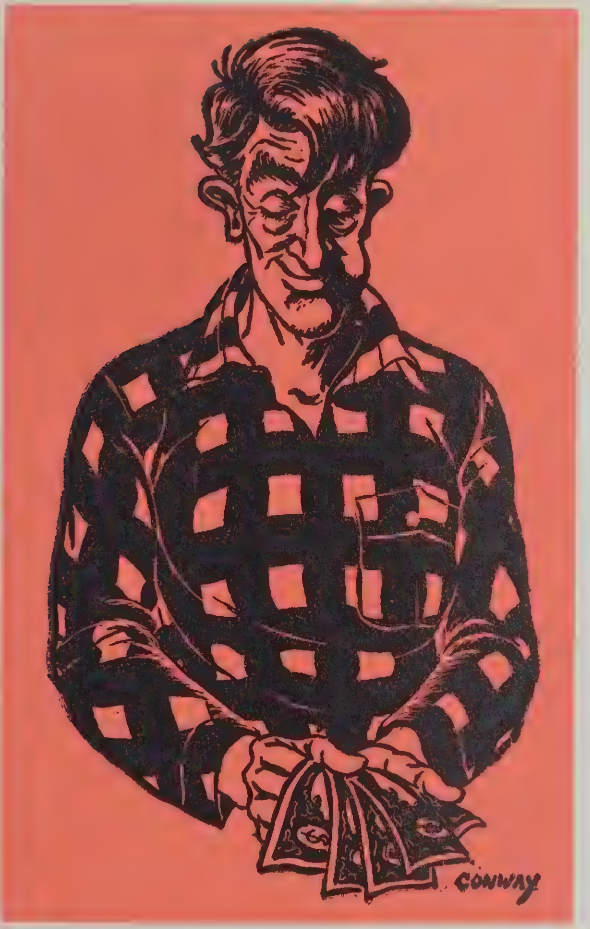
is said that Nosey Hill always carried a bunch of bristles in his pocket. He delighted in showing a green machine tender how a real clever machine tender could solve practically any papermaking problem.

Unseen, Nosey would stick one of these bristles into the felt. When the new machine tender was just about ready to give up the ghost, Nosey would approach him and offer to clear up his trouble, but for a price—usually a matter of ten bucks or so. The green machine tender invariably grabbed at the chance, as if it were a new lease on life.

Well, Nosey would then go down to the wet end, fuss around a bit in a real professional way, and when no one was looking, pull out the troublesome bristle.

On such a job, Nosey collected two kinds of credit—the kind he got for being a very clever machine tender, and the kind he could spend.

(To be continued)



On such a job, Nosey collected two kinds of credit. . . .

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For years, printing ink manufacturers have had to pay a premium for custom-made resins to produce high-gloss inks that keep their good qualities, even after long storage. Hercules creative research has now developed a low-cost, light-colored resin—Pentalyn 802A Pale—designed especially for inks. The result is good news for both printer and reader.

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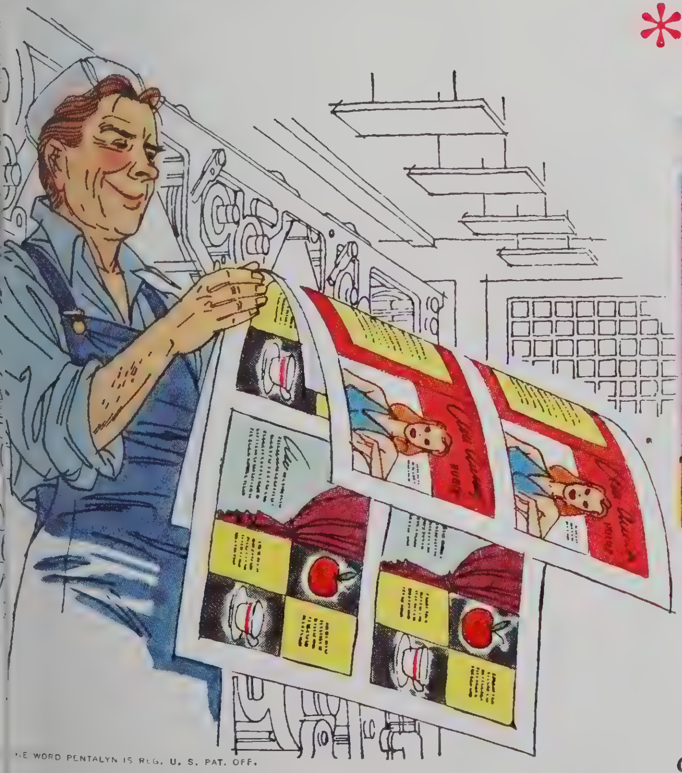

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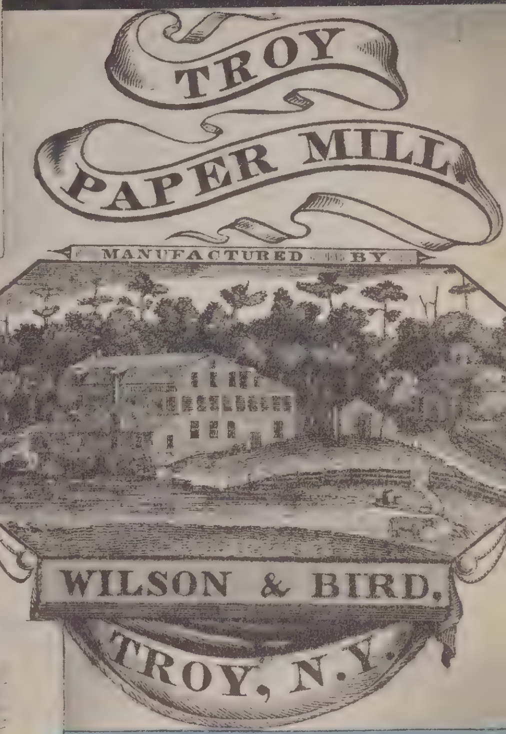

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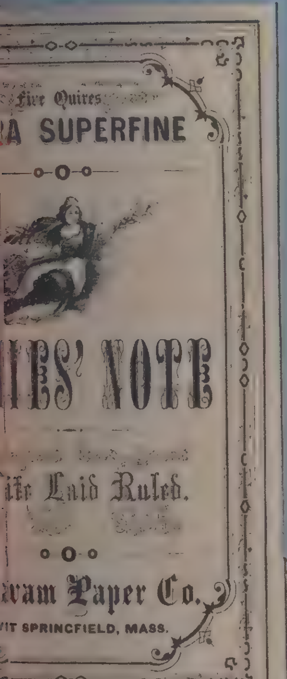

Five Quires
RA SUPERFINE
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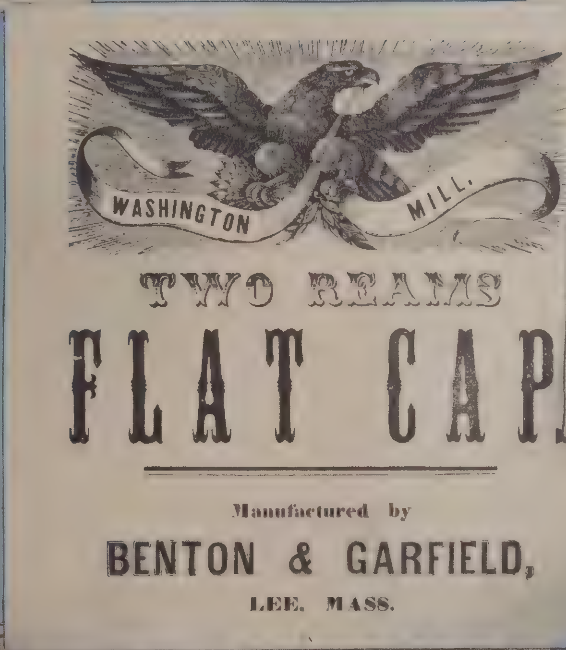
ram Paper Co.
IT SPRINGFIELD, MASS.



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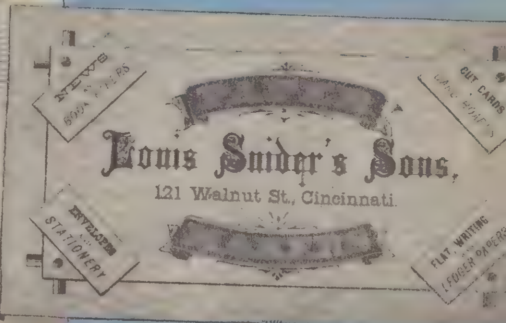
FLAT CAP.

Manufactured by
BENTON & GARFIELD,
LEE. MASS.



NEWS BOOK PAPERS
CUT CARDS BOARDS
Louis Snider's Sons,
121 Walnut St., Cincinnati.
ENVELOPES STATIONERY
FLAT, WRITING LEDGER PAPERS

THE LIBRARY OF THE
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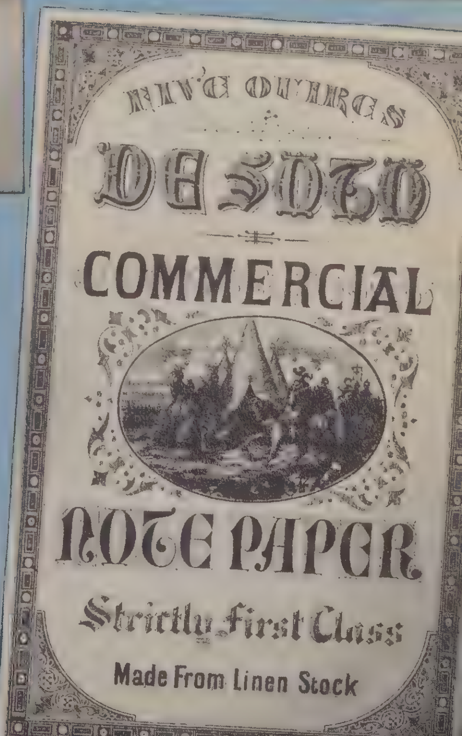
SAMPLE OF
RALPH MILLS
CHROMO LITHOGRAPHIC AND PLATE PAPERS.



FIVE QUIRES
DE SOTO
COMMERCIAL
NOTE PAPER.
Strictly First Class
Made From Linen Stock

Examples of advertisements, labels, business cards, booklets, folders, and imprinted sample sheets, used by members of the paper indu
from 1800 to 1885, are shown on the front and back covers. These were obtained from the Warshaw Collection of Business Americ

HE
APER MAKER

NSON B. TUFTS, Editor
VARD L. GRANT, Art Editor

shed February 1949, by
ER MAKERS CHEMICAL DEPARTMENT
CULES POWDER COMPANY
ington 99, Delaware

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ta, Ga., Chicago, Ill., Holyoke, Mass.,
onville, Fla., Kalamazoo, Mich.,
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Francisco, Calif., Freeman, Ont., Canada

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and: Hercules Powder Company, Limited
0 Earl Lane, London, W. 1
and: N. V. Hercules Powder Company
nge Vijverberg 12 (P. O. Box 89)
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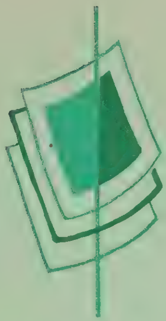


PROGRESS
IN PAPER ADVERTISING

By

WILLIAM BOND WHEELWRIGHT

ERTISING in the paper industry might be aimed to have started with watermarking, in hirteenth century. The fact that the earlier marks were entirely symbolic designs, which puzzled paperophiles ever since, may be only eflection of the widespread illiteracy of the To the extent that they identified a paper- with his product, or were deliberately used ade-marks, they functioned as rudimentary tisements.

ater centuries, when the initials and the names ermakers were incorporated with, or without, ols in handmade papers, there can be no ques- f their advertising intent and value.

orative labels are known to have been at- d to ream packages as early as the middle of xteenth century, but paper advertising hardly ced beyond this elementary stage until the of the twentieth century, as far as "fine s" were concerned.

few striking exceptions have come to our among industrial papers. The Albany Per- d Wrapping Paper Company, for example, anticipated a favorite technique of certain mporary advertisers, when, in 1885, they ned the claim for making "the only really ated toilet paper," by reproducing in an tisement, a testimonial from *Medical Record*. old advertisements of building papers have ome to our attention, which effectively show ations of the application of this product.

was natural that manufacturers of products g obvious consumer appeal should have been the pioneers in paper advertising. The makers of "fine papers" stuck much longer to watermarking, sampling, and personal solicitation, or depended on the theory that the public would "beat its way to the door of him who made the best mousetrap."

The late Byron Weston is known to have issued some circulars, and to have missed no opportunities to "talk up" his papers. Typical of his practice is one anecdote: On entering a bank on other business, he would stop at the bookkeeper's cage and ask what paper was being used in his ledgers. When the clerk replied that he did not know, Weston would say, "Look at the watermark—'Weston's Linen Ledger.' I made that paper. It is the best ledger paper made, and don't you forget it!"

The paper manufacturers of that era would have found obstacles in the way of consumer advertising. Only a few of the earlier American watermarks were acceptable to paper jobbers, who much preferred to sell paper under their own brand names or watermarks.

This forced the manufacturer to keep a variety of dandy rolls with different watermarks, or a lot of different labels, which were used as specified.

Introducing a New Era

Better business can be credited, in a considerable measure, to the introduction of advertised mill brands sold at suggested and advertised resale prices. The initiation of this procedure should be credited to the late Willis H. Howes. In 1895, Sir Thomas Lipton's yacht *Valkyrie* had lost the America Cup Race to the *Defender*, for which Mr.

An advertising envelope used by Partridge and Curtis at Lawrence, Massachusetts, in 1860.

Howes had named a new and distinctive cover paper. The story of "Defender Cover," obtained by letter from its originator, is here given in his own words.

"I showed it to Mr. Power of Carter, Rice & Co., who asked me to permit him to show it to Mr. Carter. Although I had done business with their house, I had never met Mr. Carter. When I presented it to him, he said, 'that is the newest thing in cover paper that has been shown in twenty years; what is your proposition?'

"'Mr. Carter,' I said, 'it's very definite; the price to you is 10c per pound; you to sell at 15c per pound on lots of 600 pounds. You may give a trade discount of 10% and I'll give you the exclusive sale in New England for one year, if you'll give me an initial order for $1,000 worth.'

"Mr. Carter accepted immediately. That was the first resale price that was ever made."

This incident is of historical importance because it established a precedent, without which advertising to the ultimate consumer by a paper manufacturer would have been impractical. Its acceptance was the beginning of the present practice of selling mill-brand paper through chains of exclusive distributors at advertised resale prices. It also shifted the cost of sampling and advertising to the manufacturer and led, in due course, to planned paper advertising in the trade papers, and, in some instances, in national publications. But for years it was considered practicable only in t of distinctive specialities or watermarked papers."

During the last decade of the "gay nin there occurred a notable revival of fine p under the leadership of William Morris established, in 1891, the Klemscott Pres influence soon spread from England to the States and stimulated a demand for better under such master printers as D. B. Updike Rogers, and William Dana Orcutt. This, i led to an appreciation of what Marshall said to have called "the commercial v beauty."

Further Advances of Advertising

Elbert Hubbard was among the pioneers the advertising value of better paper, at his Roycroft Shop in East Aurora, New York. come as a surprise to the paper industry that Dard Hunter "designed all manner of pr at the Roycroft Shop—"booklets, magazine advertising for department stores, banks, t restaurants."[1] Yes, in 1903 direct advertisi on the march, and paper manufacturers gras opportunity to cater to it by producing ook papers and a flock of fancy cover papers. they began to advertise, but not for some he more staple lines.

---

[1] Hunter, Dard, *Before Life Began*, Cleveland, The Club, 1941.

trend was greatly stimulated by the appear- 1903, of a notable magazine, *The Printing* blished by The University Press, Cambridge, husetts. William Dana Orcutt was the manager of the Press, and his editor, Henry Johnson, was instrumental in stimulating of advertising by the paper trade by means ctively printed inserts.

e reflection of the status of paper advertising t time appears from an examination of e I of *The Printing Art*, in which seventeen t paper concerns are represented. Nine of vere manufacturers, seven were merchants, e was a converter. The manufacturers, with ception, displayed inserts, all of which over papers except one, which was a speci- deckle-edged book paper. The others used vertising space, in the conventional manner e days.

may be compared with the amount of paper sing in a late 1948 printing-trade journal as ication of progress in paper advertising. g in that issue contained forty-nine paper sements, of which forty-one publicized cturers and only eight were paper merchants, f which featured the same mill brand.

ling was the accepted form of mill advertis- d its distribution was facilitated by the introduced by the publishers of *The Printing* til 1908, when a new ruling by the U. S. fice banned magazines from carrying inserts mentioned the name of the paper displayed, merchandise rates of postage were paid. in February of that year, The University troduced a supplementary publication called *nting Art Sample Book* which complied with v ruling.

interesting to note that by this time the of papers advertised had expanded to in- vatermarked bond, text and book papers, kins, blotting papers, post card, and the glish-finish book paper advertised under a and.

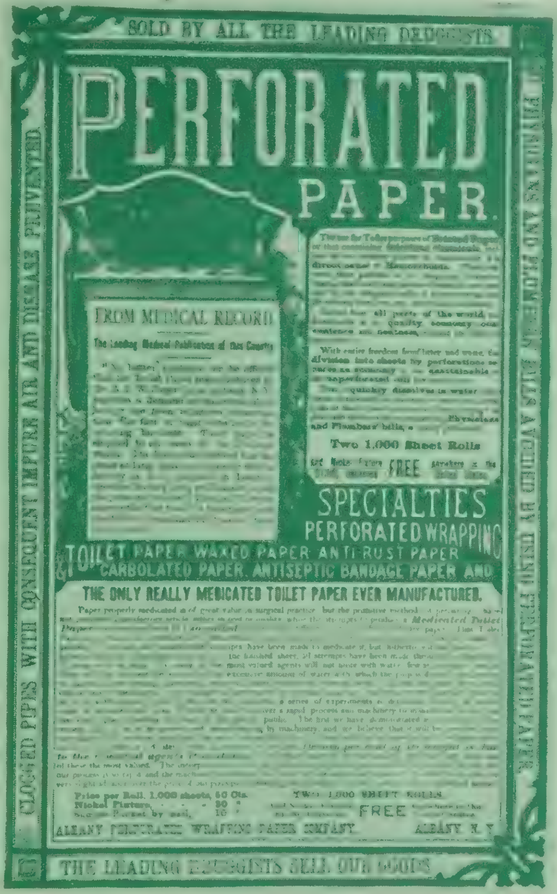
urrently, printed samples were provided by ls for the sample cabinets of their dealers, number of notable bound books were d for direct distribution to select lists of and important users of direct mail adver-

Mill Brands Advertised to Consumers

But it was gradually dawning upon the pioneer mill-brand advertisers that they might profitably seek to influence businessmen to specify their papers, instead of depending solely upon the paper merchants and printers to recommend their brands. In this way, also, they hoped to create inquiries which would assist their distributors and encourage them toward better cooperation.

In this connection, two trade papers, through their active solicitation, played an important part: *Printers' Ink*, the "bible of advertising men," and *System*, a progressive business magazine no longer extant. A number of paper mills began using space in these publications. This paved the way toward the introduction of paper advertising in national magazines.

The cost of national advertising struck most paper manufacturers as wasteful, if not prohibitive. It was likened by someone to "buying a bushel



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Price per Roll, 1,000 sheets, 50 Cts.

TWO 1,000 SHEET ROLLS FREE

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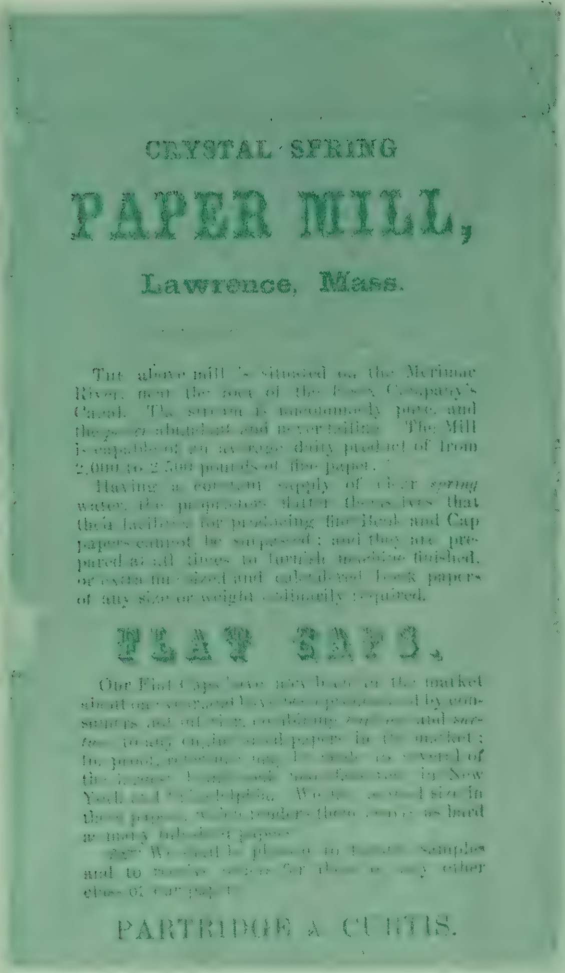
THE LEADING DRUGGISTS SELL OUR GOODS

CLOGGED PIPES WITH CONSEQUENT IMPURE AIR AND DISEASE PREVENTED

PHYSICIANS AND PLUMBERS BILLS AVOIDED BY USING PERFORATED PAPER.

An early example, 1885, of a testimonial advertisement.


CRYSTAL SPRING
PAPER MILL,
Lawrence, Mass.

FLAT CAPS.

PARTRIDGE & CURTIS.

A Crystal Spring Paper Mill advertisement of 1860.

of oysters to get a jill of crabs." But instead of having been only a "flash in the pan," it became an established policy, which influenced others, in turn, to recognize the applicability of national advertising to paper merchandising, even when their product lacked immediate consumer appeal.

In the case of paper and paper products, which are obviously of interest to the layman for personal use, the value of advertising in national media was less debatable. This reasoning applied also to papers the layman could identify by means of papermarks, or watermarks, provided the potential market was sufficient to justify the expense.

Manufacturers Group Sponsors Direct Advertising

Fortunately for the manufacturer, direct advertising was emerging from its Cinderella-like status
in the councils of advertising. For the first
in 1913, at a convention of the Advertising Cl
the World, this branch of advertising becam
culate. As a delegate to this convention,
impressed with the possibility of forming a
of manufacturers who were anxious to explo
brands.

This inspiration led to the foundation o
Papermakers' Advertising Club, since kno
an Association, with thirteen charter me
Its cooperative efforts were planned to intere
educate printers in the promotion and pract
direct-by-mail advertising, counting upo
favorable reactions to increase the deman
their mill-brand papers.

The first step was the publication of five
tional text books covering the technique of
by-mail advertising. Each volume contai
Partial Directory of Mill Advertised Brands
Paper Makers' Advertising Club, under the
head of *Nationally Distributed Uniform*
Papers.

A master mailing list was compiled from t
of all members. During the year 1914, thes
chures were delivered at regular intervals, w
immediate and widespread commendation.

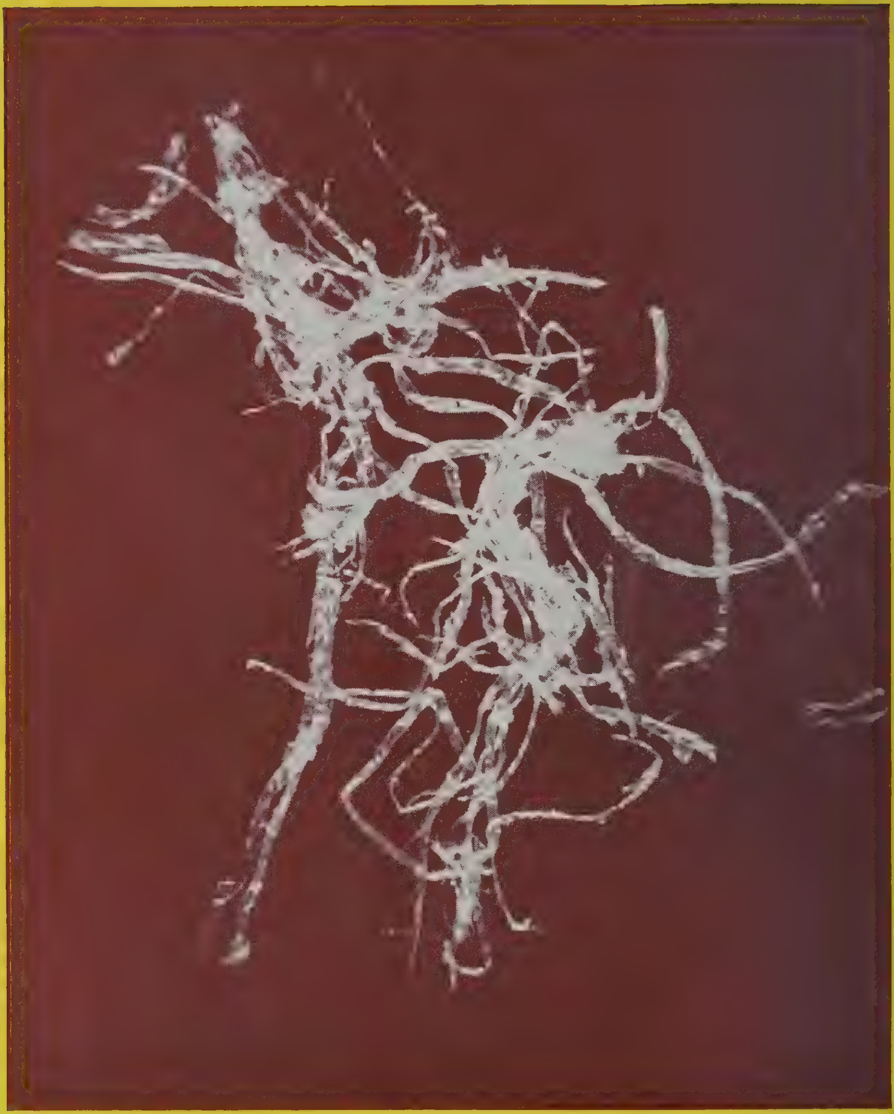
During 1915, the campaign was continu
means of double-page spreads in *System Ma*
which was then the dominant periodical fo
ness executives. The following year *Direct A*
ing, a publication started two years previou
Brad Stephens and George Heintzmann
purchased by the Association, and Mr. St
was retained as editor. No single force ha
more potent in the spread of the kno
and effectiveness of direct-by-mail adve
or, especially, in the promotion of mill
papers.

Following the lead of the pioneers, man
graduated from the primary school of adve
into becoming full-fledged national adve
whose publicity is to be seen, not only i
papers, but in the business periodicals,
events, and popular magazines. The A
Paper and Pulp Association was seriously co
ing an ambitious public relations campaign
World War II put an end to such thought
conceivable that in the next decade the vers
and economy of paper and paper products ma
to our ears and eyes by radio and television,
the only media not yet employed in the p
of paper advertising.

ADVERTISING THE ADVANCER

This is the accelerating force of modern business ☆ It puts seven-league boots on products . . enables them to take huge strides ☆ This is the elixir of commerce . . everlastingly rejuvenating the life of trade ☆ It invests products with magnetized identities . . gives them an esteemed presence ☆ Advertising creates great names that must be lived up to . . inspires objects of its praise to surpass themselves ☆ It generates gigantic demands and geniuslike moves mountainous obstacles when called upon ☆ It exalts the standard of living to new heights and removes mental hazards by hurdling them ☆ It is an ever-present guide on highways and "buyways". . dispensing data that make for an astutely informed public ☆ Its living light saves many a product from the dark menace of obscurity and oblivion ☆ Advertising . . it glorifies the printed word with images of the better life and unceasingly whets the will to achieve.

—P. K. THOMAJAN



WHICH TREND DO YOU FOLLOW?

Artistically: The dance of the fibers

Technically: Bleached and beaten spruce pulp,
36-diameter enlargement

Some PAPER MILL LABELS

OF ANTIQUARIAN INTEREST

DESIGNED AND ENGRAVED BY

ALEXANDER ANDERSON

The First Wood Engraver In This Country

BY HARRISON ELLIOTT

E paper mill label, that is, the papermaker's se of pictorial art on his paper wrappers, osely related to handbill advertising, those urated shop bills employed by tradesmen. This red advertising had its inception in the seven- th century.

A early instance of pictorial art in advertising n eminent artist was the work of William grth (1697–1764). In 1720, when Hogarth was ey-three years of age, he made an engraving lvertising purposes, a handbill exploiting him- f a designer and engraver of business announce- n, which he executed in many forms for a y of trades and professions.

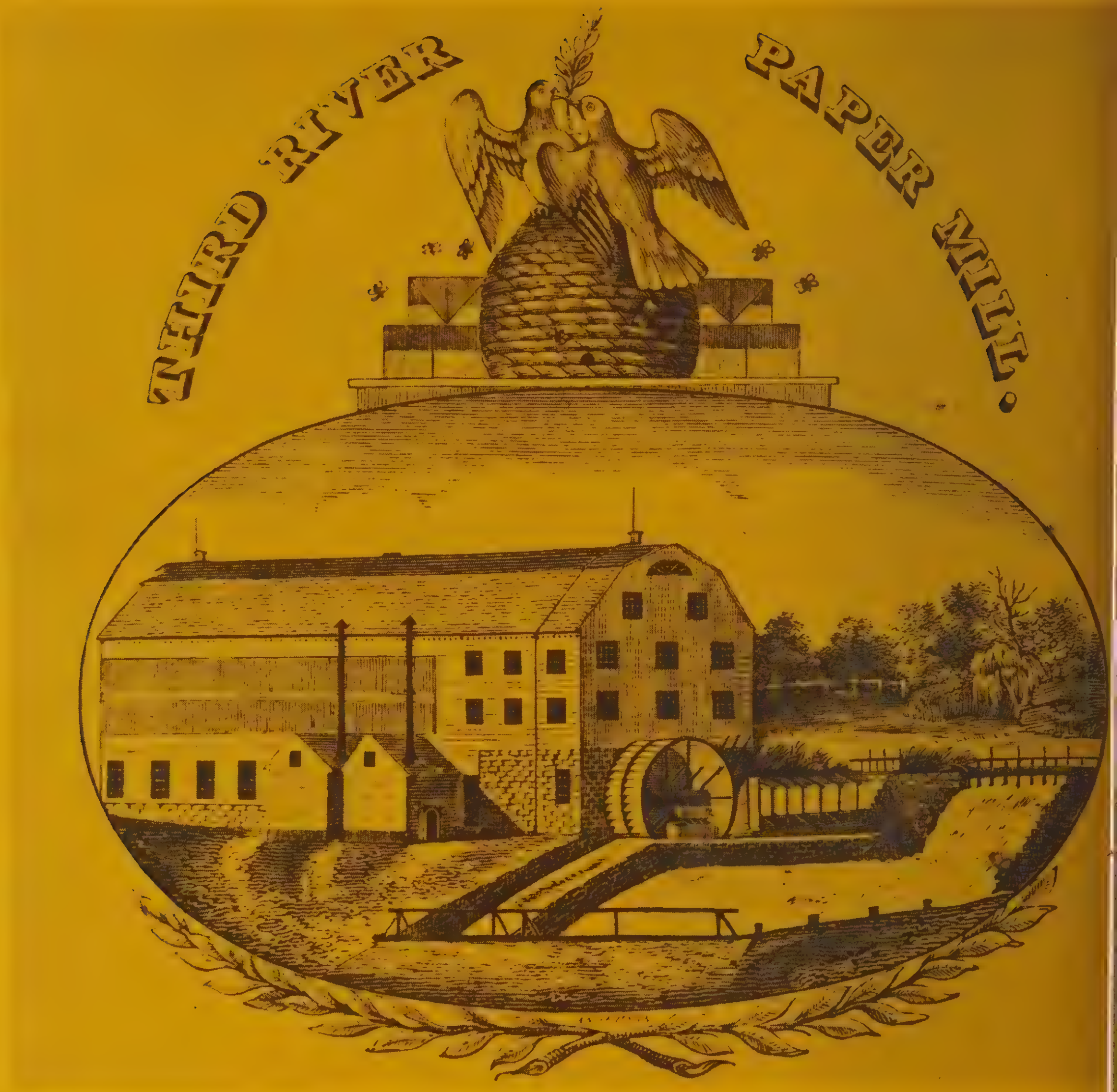
ntion is made of this phase of Hogarth's art h was the prototype of Dr. Alexander Anderson 7–1870), who was this country's pioneer wood rver, and who in his conscientious pursuit of alling studied and adopted something of grth's style. Hogarth's illustrations made a g impression on Anderson's young mind, and, h put it, "determined my destiny." A com- avely small phase of Anderson's work was the ning and engraving of paper mill labels, some bles of which are reproduced in the accom- yng illustrations.

The paper mill label has become a collector's item, particularly when artistically executed with a fidelity of detail that imparts to it historical interest as an authentic portrayal of vanished paper mills, their exteriors and interiors, the crews at work, the equipment used and its layout. These labels are of considerable antiquarian importance. When an eminent artist was employed in their design, it was evidence of a mill proprietor's pride in his plant and its product.

Package Labels Were Early Sales Aids

The papermaker seemed to have a sense of the appeal a bit of art might have in the sale of his commodity, and gave some thought to the appearance and appeal of his package. This was more evident prior to the advent of the papermaking machine, which produced paper in rolls, than when paper was made on a hand mold which limited the size of the sheet. Paper was then packaged in comparatively small bundles.

These ream packages were of a size which gave the label much the appearance of a poster or an elaborate trade-mark. Those made by Anderson were done with a degree of accuracy and with due regard for their decorative value. The wooden buildings

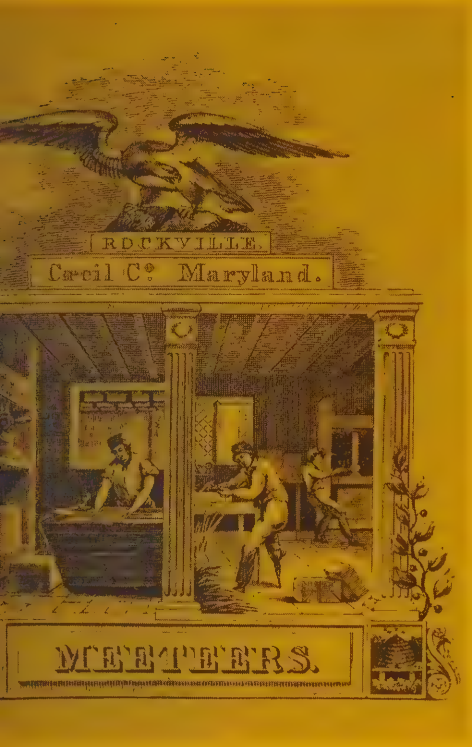

THIRD RIVER PAPER MILL.

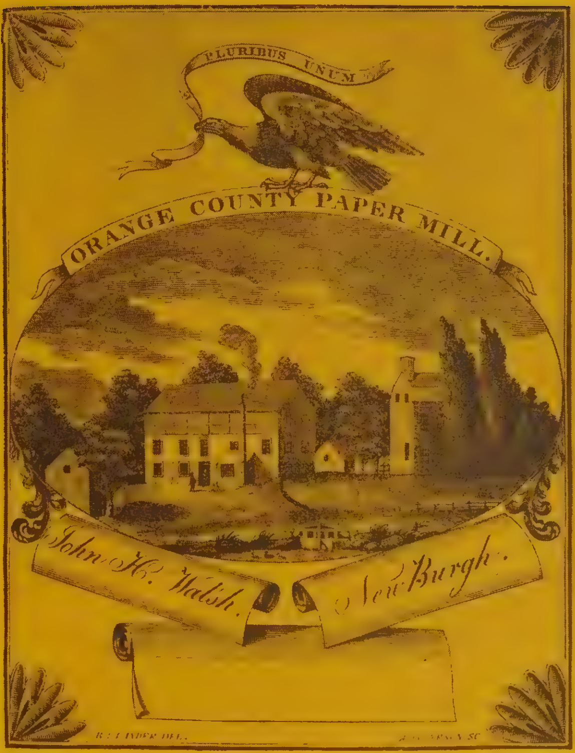
so carefully portrayed by the artist have long since vanished from the scene. Fires were frequent and destructive. Perhaps the phoenix, which is part of the design of one label here depicted, is not without its significance. Fire insurance companies employed the same device.

The Father of Wood Engraving

Anderson is justly called the father of wood engraving in this country. The term "wood engraving" is used here to distinguish it technically from "woodcut" of earlier origin; the woodcut being produced on the flat-grain block, that is, with the grain in the wood running parallel to the surface of the block. The cutting is usually done with a knife and other wood-carving tools. Wo graving is executed on the end-grain, the running perpendicularly in the block. Th sort of graver is used as employed in engrav copper and steel. The graver permits a fin than that produced by the woodcut metho sequently, more delicate effects in textu obtained.

Anderson held somewhat of a monopoly field of wood engraving for a number of yea proficiency, productivity, and versatility a designer and engraver enabled him to exec endless variety of copper and wood engrav illustrations for newspapers, magazines, sheet ballads, business cards, scientific tr




PLURIBUS UNUM
ORANGE COUNTY PAPER MILL.
John H. Walsh.
New Burgh.

es. The cuts range from tiny vignettes, one-
of an inch in size, minute in detail, to a
graving, in full size, of a human skeleton.

Notes on Our Illustrations

ing now to the accompanying illustrations:
bel of the Third River Paper Mill, one does
v whether the doves of peace are struggling
ssion of the olive branch or whether one
ng the other in an attempt to carry on. The
ne is rather effectively done with much
or exterior detail.

ockville, Maryland, Mill label depicts a
usy crew. The vatman with a hand mold
be holding the mold over the vat, per-
the water to drain from a newly formed
The operative with the artificial limb,
a carefully thought-out detail, appears
ting up rags. The man at the screw press is
squeezing the water from a post of newly
eets. The ornamental beehives at the base
lumns betoken industry, a common symbol
much used by papermakers.

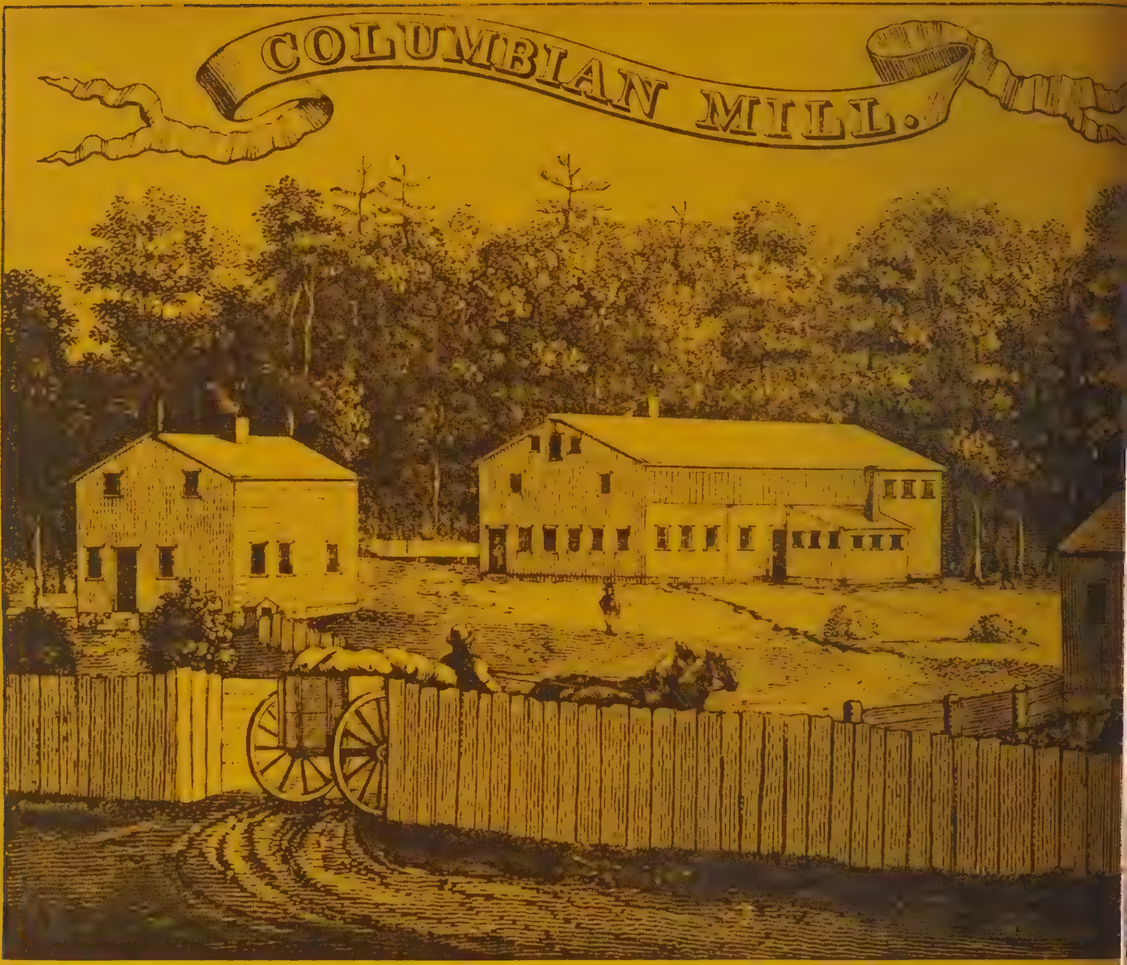
bel of the Orange County Paper Mill at
gh, N. Y., is rather ornate, and although
has the appearance of isolation, the man-
obviously holds to the view that in union there is strength. The eagle above all is indicative of might.

The Columbian Mill's activities antedated the use of wood as a papermaking material or there would not have been that rather dense wood lot right at its door. However, wood was much used as fuel. The wagon entering the mill yard is loaded with rags.

D. Hoogland's label depicts the work of an industrious crew, the vatman, coucher, and layer. The screw press is a somewhat cumbersome affair, more functional than ornamental. One wonders if the busy crew received enough reward to sweeten its labor.

The Hanover, N. J., Mill must have had some experience with fire. The man at the beater appears to be charging it with cut-up rags. But if he doesn't cover the roll, he will be in for a shower bath when he starts up the beater. At the left of the proprietor's name is a hand mold and to the right neatly packaged paper.

The Bronx Mill label exploits the product of David Lydig's mill on the Bronx River. Peter A. Mesier was Lydig's brother-in-law. The remains of the dam of this mill may still be seen on the grounds of the New York Zoological Gardens in New York City. The Lydig mill was destroyed by fire in 1822


COLUMBIAN MILL.

and was not rebuilt. The motto might well be employed today.

A Long and Useful Life

Born in New York City, April 21, 1775, Anderson almost attained his ninety-fifth birthday, dying in Jersey City, January 17, 1870. At the age of twelve he began to practice the art of drawing and engraving on plates made of copper pennies, with a graver he improvised from the back spring of a pocket knife. On his first plate, he engraved the head of Paul Jones. He built himself a crude roller press, and made his first impression with red oil paint. Later he had a blacksmith make him better tools which enabled him to engrave a number of cuts of houses and ships on type metal; these he sold to newspapers.

His father saw him studying and copying the illustrations of some medical books and determined to educate him for the profession of medicine, having little faith in his son's artistic ability.
fourteen, he was apprenticed to Dr. Yo
prominent physician who had served as a s
in the Continental army, and with whom he
for five years. In 1796 Anderson graduate
Columbia College and obtained his deg
medical doctor.

At the age of twenty-one Anderson bec
licensed practitioner of medicine and follow
profession for a number of years. When the
fever epidemic broke out in New York C
1795, the young doctor did noble work amo
stricken in Bellevue Hospital, at a salary
dollars a day.

His sensitive nature did not relish the phys
great responsibility in hospital work, but,
by his parents, he reluctantly continued to p
for some years, pursuing his profession
diligence and conscientiousness. An entry
diary reads, "My present employment is

OPE OF REWARD SWEETENS LABOUR.
. HOOGLAND.

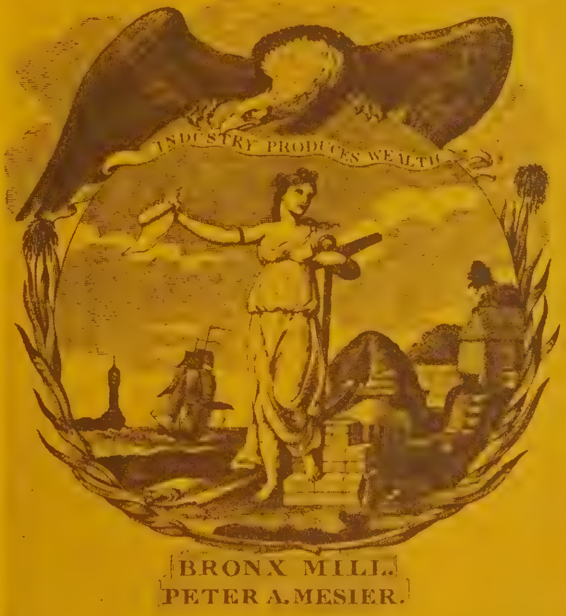
the grain—a sense of duty and acquiescence will of God are the chief motives which me here." The practice of medicine finally so distasteful to him that he abandoned it oted himself exclusively to his art.

uch time as he could afford from his medical e spent in pursuit of his art. While still a of medicine, he became so proficient in ng that all the New York publishers— Freneau, the poet of the Revolution, and Gaine, the bookseller and newspaper pub- employed him.

e age of eighteen he became a great admirer ck whose style he copied, that is, the white- thod executed with a graver on the end- of boxwood. He found boxwood much to his graver than metal, and in 1812 began vood and used it entirely thereafter. He had ed engraving on wood in 1793 when he d engraved a tobacco stamp.

seventy-seventh year he drew and engraved merous illustrations for a fine edition of peare's plays. He continued his work and was still engaged in it, though to ed extent, into his ninety-fourth year, a rolific career that covered nearly eighty- ears. His work was always much in de- not only at home but abroad, and for several e furnished religious pictures to Spanish in Mexico, South America, and the West

nearing his eighty-fifth birthday, he


INDUSTRY PRODUCES WEALTH
BRONX MILL.
PETER A. MESIER.

designed and engraved a new business card of his own, bearing upon a ribbon of the design the somewhat humorous motto: "*Flectus non fractus*"—bent not broken.

Anderson was an intimate friend of Washington Irving's who described the artist as "handsome, artless and full of good humor, and as gentle as a woman." He was conscientious and would not consent to receive more than he considered a fair price for his work. Not the least of his accomplishments was the painting of miniatures, which he did very daintily on ivory.

Regardless of his retiring and bashful disposition, he made many friends among prominent people. Lossing said of him, "He was genial in thought and conversation and had a quick pe tion of genuine humor. To him, the world delightful place to live in, because it was a refl his own sweet spirit. He was extremely regul all his habits. He once said, 'I would not s after ten o'clock at night to see an angel.'"

A fitting conclusion for this discourse is th entry in Anderson's diary for 1798, under da December 31, when he was but twenty-three my head is not very fertile at present I can but a few remarks on this past year. A treme scene have I witnessed but yet I have reaso thank the great Author of my existence, an still convinced that 'Whatever is, is right.' I no petition for the ensuing year."

Dr. Anderson at the age of forty-four.

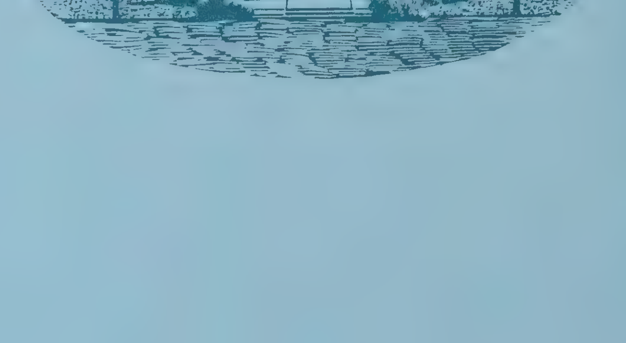
HONORS TO THESE

CLARENCE E.
LIBBY

TO CLARENCE E. LIBBY—for his professional career of more than thirty years in the pulp and paper industr he having associated himself with a firm of industrial engineers as chemist in charge of a paper-testin laboratory immediately following his graduation from one of New England's best-known universities in 191 with a degree in chemical engineering (being one of the first graduates of his alma mater to have specialize in papermaking) and remaining in this field throughout the succeeding years; for his work during World W I in cellulose research for a well-known munitions manufacturer, thus probably becoming one of the fir persons to purify and nitrate wood pulp for the production of explosives; for his outstanding educational an research accomplishments in the field of pulp and paper—accomplishments that date back to 1920 when associated himself with a college of forestry—today, the largest forestry educational institution in the world— to develop course work in pulp and paper manufacture (a novelty then and still unique in the field of forestr education); for his vision and "drive" during the succeeding years in promoting the development of a colleg laboratory, built in 1937, that contains semiplant-scale pulping equipment for mechanical, chemical, and sem chemical pulps and actual plant-scale beaters, refiners, and a combination fourdrinier-cylinder paper machin (he also being responsible for its design and construction), a laboratory—representing an investment more than $500,000—that was operated 24 hours a day during World War II for the production of a new-typ paper product developed by the research staff of the college and used by the armed services; for his "stick-to-i iveness" in the promotion of a research project presently under way covering the development of more satis factory papermaking pulps from northern hardwoods (a project sponsored by a group of papermaking firms that may prove to be a major contribution in the perpetuating of the industry in the Northeast; for his activ participation in the affairs of several associations connected with the industry (Technical Association of th Pulp and Paper Industry, Technical Section of the Canadian Pulp and Paper Association, and The America Pulp and Paper Mill Superintendents Association, Inc.) as well as other allied groups; for his contributions t the literature of papermaking—there being a considerable number of articles in the literature credited to him and above all for his never-failing interest in the success of the graduates of his department—he having place nearly 400 graduates in jobs over a period of more than 20 years—many of them now occupying importan positions in the industry—and for his personal contacts with them continuing to this day—surely a fittin testimonial that "A man's true wealth is the good he does in this world."

HARRY H.
STRAUS

ARRY H. STRAUS—An American by choice, having come to this country from Germany
n he was nineteen years old, for his Americanization of the cigarette-paper industry (he
en both an importer of cigarette paper to the United States and a manufacturer of such
'rance) through the building of a mill in the Smoky Mountain region of North Carolina—
ich went into operation on August 17, 1939, that utilizes flax straw from Minnesota and
as its fibrous raw material, and which today, employing approximately 1600 persons,
cigarette paper sufficient to make over one billion cigarettes a day as well as a sizable
f high-grade writing, air mail, and text papers; for his genius for business, he having
nd been president of 15 companies, the last of which was the cigarette-paper mill enter-
e coming to America; for his belief in the need of industrial research and for his initiative,
nce, and risk qualities that led him to tackle the problem of utilizing flax straw for
paper production and seeing it through to a practical unfolding—research, however,
g to receive emphasis in his operations, as such work is never finished; and especially for
al and extensive employe relations program at the paper mill—a complete athletic pro-
sic school and band for employes' children, a 400-acre employes' camp with lake for swim-
fishing, reading (a spacious library), and general employe get-togethers in picnics, shows,
es—which working together has brought about a broadened spirit of good fellowship
e people affected by it, thus making for better living—a Chevalier of the Legion of Honor
, also holder of an honorary degree of Doctor of Engineering from one of the better-known
es of the Tar Heel State, the state with the motto—Esse Quam Videri (To Be Rather
Seem)—a motto that really typifies his ambitions and accomplishments.


LABORATORY
HERCULES POWDER COMPANY

the *HERCULES* automatic emulsifying process for rosin size

A NEW PROCESS for the automatic emulsification of rosin size, known as the Hercules Automatic Emulsifying Process,* has been developed by Hercules Powder Company. Designed primarily to assist the paper industry in continuous sizing and automatic operations, it is the latest in a series of major Hercules developments in the utilization of prepared rosin size, such as (1) tank car shipments of 80 per cent solids prepared size, (2) the Hercules Rosin Size Emulsifying Process (Pats. 1,111,689 and 1,540,592), and (3) dry rosin size.

This automatic process has been found of distinct advantage in:

Lowering labor costs
Reducing space requirements
Achieving greater uniformity of emulsion concentration
Maintaining uniform quality of the size emulsion
Making possible the use of special sizes, formerly impractical because of limited emulsion stability

These advantages, however, are dependent upon specific conditions at the individual mills concerned. In mills where size emulsification is a minor part of the operator's duties, the widely used batch process may best fit overall mill operations; in other mills with special requirements, dry rosin size may be indicated. The Hercules Automatic Emulsifying Process should be investigated wherever minimum size preparation or maximum uniformity in quality of emulsion is necessary. Hercules representatives will be pleased to discuss with you the advantages of the automatic process in your mill.

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*PAT. APPLIED FOR

To be effective in sizing paper, rosin must be very finely dispersed and uniformly distributed through the stock before the sheet is formed. This is customarily accomplished by solubilizing the rosin in the form of a sodium soap, and adding a dilute solution of the rosin soap (size) to the stock.

In the early stages of the art of rosin sizing, it was necessary to use an excess of alkali in preparing the size in order to attain solubility. Later, as the efficacy of free rosin sizes became apparent, processes for dispersing sizes containing free rosin (i.e., sizes resulting from partial neutralization of rosin) were developed. The most satisfactory of these, such as the Hercules Rosin Size Emulsifying Process, are based on the formation of an intermediate, or primary, emulsion of 12 to 20 per cent solids content at a temperature of 160° to 180°F., followed by relatively rapid dilution with cool water to 3 to 5 per cent solids content. Specific conditions depend upon the grades of size and rosin used. Employing these principles, it has been possible to use satisfactorily size containing as much as 40 per cent free rosin.

In application of these principles it has been almost universal practice in the industry to use batch operations. Size at 60 to 80 per cent solids is drawn from storage tanks or drums to a calibrated tank and heated to the desired temperature. The heated size is then mixed with hot water, usually by combining streams of the two at controlled rates, and transferred to the emulsion storage tank where it is diluted with cool water. Concentration of the final emulsion is controlled by the amount of size used from the calibrated heating tank.

Inasmuch as up to 250 gallons of size emulsion for each ton of paper is required, the necessity for either large emulsion-storage capacity or frequent preparation of emulsion is obvious.

EXPLANATION OF PROCESS

The Hercules Automatic Emulsifying Process, illustrated on the following insert, utilizes a Triplex Unit consisting of three properly sized proportioning pumps, driven by a single motor, which deliver at definite, predetermined rates the three components necessary for proper emulsification of rosin size—size, hot water, and cold (less than 100°F.) water. Each pump of the Triplex Unit is individually adjustable as to output, thus assuring maximum flexibility in meeting the varied conditions requisite for emulsifying specific grades of rosin size.

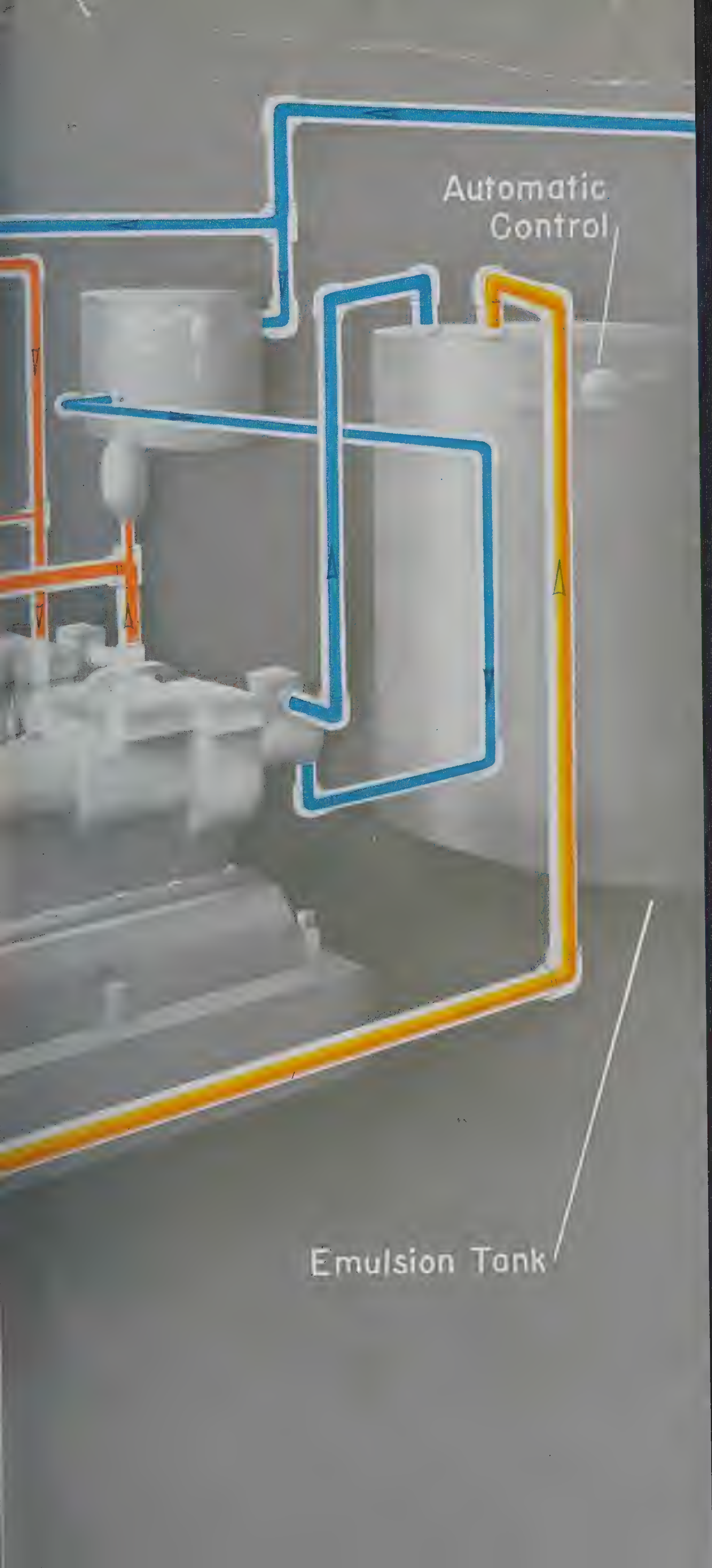
KEY

ROSIN SIZE

HOT WATER

COLD WATER

STEAM

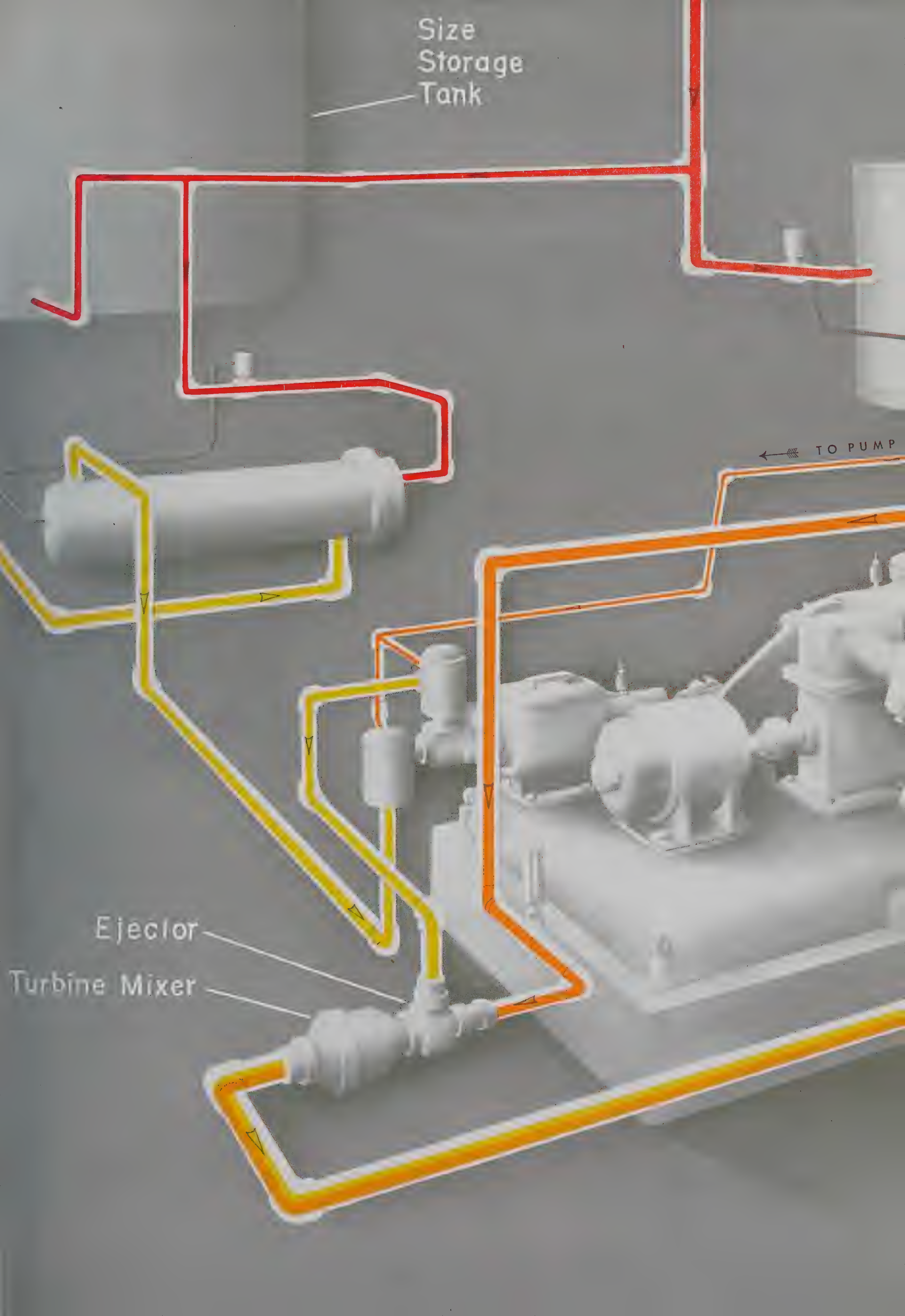

Automatic Control
Emulsion Tank

The Hercules Automatic Emulsifying Process is most easily understood by following the flow of size through the process. The paste rosin size flows from a storage tank through a heat exchanger, where the temperature is brought to a predetermined value (controlled automatically by a temperature regulating valve), and flows into the rosin size pump of the Triplex Unit.

The hot size is pumped to a mixing unit known as the Ejector. At the Ejector, it is combined through venturi sections with a stream of hot water from one of the pumps of the Triplex Unit to form the primary emulsion. The venturi sections of the Ejector are constructed so as to give maximum mixing and homogenizing of the size and hot water. The primary emulsion formed in the Ejector flows through the Turbine Mixer, which is a cylindrical chamber containing a spiral rotating baffle, where further mixing takes place. After leaving the Turbine Mixer, the emulsion flows to a small storage tank with a capacity for four to six hours' mill supply, where it is diluted to its final concentration with cold water from the third pump of the Triplex Unit.

The emulsion storage tank is equipped with a float-control device which starts and stops the motor of the Triplex Unit as the emulsion level in the tank drops or rises to the control points, thus making the system function automatically. Size emulsion is drawn from the storage tank as needed.

An interesting and highly satisfactory modification of the process as described can be made in a mill where size emulsion is being added to the stock at only one point. A variable speed motor drives the Triplex Unit. The process is operated continuously at rates controlled by a calibrated rheostat located in the machine room. Since emulsion flow is direct and com-

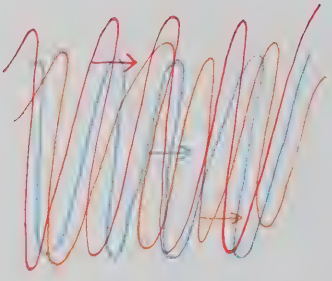

Size
Storage
Tank
TO PUMP
Ejector
Turbine Mixer

plete to the stock at one point, the process functions not only to prepare emulsion but to meter emulsion to the stock.

As can be seen from the foregoing description, the automatic process operates on the same phase principles as those utilized in batch operations of the Hercules Rosin Size Emulsifying Process. Because of its automatic principles, which provide fresh emulsion in what approaches a continuous supply, the automatic process makes practical the use of emulsions of limited stability. An example of this is rosin size containing large proportions (20 to 30 per cent) of wax. Without the use of special stabilizing chemicals, it has not been feasible to prepare emulsions of such rosin-wax size of stability greater than a few hours. With the Hercules Automatic Emulsifying Process, which eliminates the necessity for storage of large quantities of emulsion, rosin-wax size emulsions are used before their period of durability expires.

The principal advantages of the automatic process, in addition to the field of developments opened up by making the use of meta-stable emulsions feasible, are reduced labor requirements, and uniform quality of emulsions. When properly installed, the only labor required for the automatic process is the preventive maintenance customary for comparable mechanical equipment. The greater uniformity of emulsion results from, first, elimination of personal operator variables, and, secondly, use of fresh instead of variable or excessively aged emulsion. Other tangible, though possibly less spectacular, advantages are drastic reductions in emulsion storage capacity and in floor space requirements and use of low- instead of high-pressure steam.

EQUIPMENT INFORMATION



In the Hercules Automatic Emulsifying Process, there are several auxiliary pieces of equipment such as a small tank, equipped with float control and temperature regulator, which supplies hot water to the system, and a small tank, equipped with float control, which supplies cold water.

With the exception of the Ejector and Turbine Mixer, which are supplied and serviced by Hercules, all equipment for the automatic process is obtained direct from equipment manufacturers. Details on layout, construction, capacities, etc., are available from Hercules paper mill representatives, who will be pleased to discuss with you the automatic process in your mill.

THE ADVENTURES OF NOSEY HILL

PART THREE—CONCLUSION

ILLUSTRATIONS BY IRWIN G. CONWAY

NOSEY AND THE TURKEY

e time Nosey Hill stopped at one of the old wrapping mills, in Marcellus Falls, New York. r family lived opposite one of the mills, a 's throw across the road. Near the house we deep well of the purest spring water. The rom the mill came there many times a day nk and refresh themselves.

sey came over one day, drank deeply from d, battered tin dipper, wiped his mouth with ength of his sleeve, and was just about to back, when he our big, fat turkey ng on the limb of l apple tree. That y happened to be er's special prize. ad been fattening for several weeks, g it plump for the ksgiving Day ll, when Nosey saw that luscious bird, he just couldn't help getting a bright idea. It just sort of came natural-like. Later that night he returned to the well, swiped the turkey, carried it—flapping wings and all—back to the mill, wrung its neck, plucked it clean, and cooked it up real nice. But something was missing. Sure, Nosey knew what it was. Bread and butter, of course. Lots of bread and butter. Nosey asked my brother and me—not knowing, of course, what had happened—to run over to the house and see if we could get some bread and butter. Sure, you bet. We were happy to oblige the great Nosey Hill. That night we had such a feast as the gods of Olympus themselves might enjoy.

We felt Nosey had outdone himself to treat us so royally. In the morning we took him home to breakfast. By this time, Mother had discovered, with a fluttering, gasping horror,

Most of the Nosey Hill stories in this collection are taken from *Superior Facts,* which was a house organ of Paper Makers Chemical Corporation, edited by the late Ralph M. Snell. The contributors are listed as follows: Big Sez, Casper Grathwohl, Bing Sez, Richard Casper, Alec C. Duncan, Thomas L. Snell, Davie Fleming, D. M. Kelly, Cyrus Frye, George Bonner, Eugene Hibbard, William Stone.

Not appearing in *Superior Facts* are two additional contributors: Jim Tolland, Tom McDonnell.

. . . Carried it—flapping wings and all—back to the mill. . .

that her prize turkey had disappeared. When my brother and I noticed the sheepish look that came over Nosey's face, we realized what had happened. My brother and I didn't feel any too well. We had not only eaten our Thanksgiving Day dinner, but had furnished the bread and butter as well.

Nosey visited us many times afterwards. But whenever we saw him coming, we'd give the alarm, hustle all the poultry into the coop, and lock it up tightly. It was some twenty years later when we told Mother the truth about the mysterious disappearance of her Thanksgiving Day turkey.

That long-ago Thanksgiving Day dinner was one we never forgot. What did we have instead of the turkey? Fried squirrel legs. And all on account of Nosey Hill. He was a character.

SALT IN SYRACUSE

One time Nosey Hill was having a bull session with some novice papermakers and a few old-timers. He was explaining the finer points of the genuine roving papermaker and how he got his living. He pointed out that the genuine roving papermaker not only had to know his job thoroughly,

but also had to
how to get food, clot
drink, lodging, and t
portation, with eas
dignity. All this
emphasized, took
ability.

During the talk,
of the younger men
of the group interru
Nosey to mention
name of one whon
admired as a g
example of the r
papermaker.

"A-h-h-h-," gru
Nosey, and spat
gustedly. "Why
couldn't bum sal
Syracuse!"

We didn't get th
meaning of Nosey's
tempt until we lea
that salt in Syracu
more plentiful
snow at the North
Nosey had little us
anyone so unresourceful as not to be ab
bum salt in Syracuse.

NOSEY AS SUPERINTENDEN

Sometime around 1900, Nosey Hill found
that the mills in Millinocket, Maine, were a
tising for a first-class papermaking superinten
Nosey applied for the job in a letter filled
unabashed statements of his rare ability as a p
maker, and of his invaluable experience as a l
of men. The mill executives were much impre
They sent for the famous Nosey Hill at once

To Nosey, the term "at once" was like a
Wimpy to have another hamburger. He was
at any time overburdened with possession
baggage, or obligations. He left the day he
the notice, and arrived in Millinocket three
later.

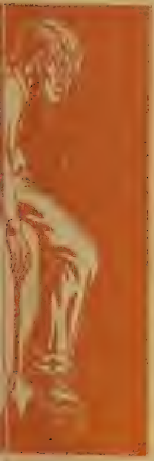
Meanwhile, the mill management had pos
delegation at the depot to watch every inco
train and to greet Nosey, when he arrived,
style proper to his position. But after three
of waiting, they got a little tired and were
about to call it quits when an old, battered f

came puffing and
ing into the station.
ommittee, of course,
no attention to just
her freight train.
were looking for
de luxe symbol of
in progress, "The
nocket Rocket," a
d proper vehicle for
reat Nosey Hill to
in.

ll, the freight train
in and grunted to a
A boxcar door rattled
and out jumped a
with all the grace
agility of a leaping
e. So it was Nosey
Who else? Nosey,
ed in a black, soft
a cutaway coat,
kled trousers, no
, and low shoes
s heels, approached
mpany delegation.
mehow figured that
a group would be
waiting for him.

me, come, gentlemen," he said, "direct me
mill office. I am your new superintendent,
ould like to attend to my duties at once!"

the way to the mill, one of the delegates,
to hold back his curiosity any longer,
Nosey how come he arrived by freight train.



t's Nosey Hill!"

"When a man of action," replied Nosey, "has cause to reach a certain destination at a given time, the method of transportation is a trivial matter." He further explained that "The Millinocket Rocket" had left Palmer Falls when he received the wire to report for duty, and so he boarded the next train through, which happened to be a freight train.

At the mill, Nosey again convinced the management of his considerable knowledge and ability. They decided to give him a trial. Nosey proved to be invaluable to them, a really first-class papermaker. But Nosey, nearly a half year later, could not resist the call of the road. He left Millinocket in his usual fashion—without notice or without ceremony.

He left Millinocket in his usual fashion. . .

THE HUNGRY SNOWMAN

It happened many years ago when I was tending machine in the old B. F. Lyon mill at Plainwell, Michigan.

One winter day, a snow- and ice-coated figure, more dead than alive, staggered into our mill, shivered his way into the machine room, and proceeded to melt between the first and second sections of the driers. As several inches of ice melted off him, we could see he was much too lightly dressed for such bitter cold weather. The boys, not satisfied with the rate he was thawing out, placed him on several sets of steam pipes. After a while, when the huge icicle hanging from his nose had nearly melted off, someone shouted: "Hey, it's Nosey Hill!"

And so it was. Nosey had battled his way through snow and ice all the way from Allegan, Michigan—a slight distance of some 25 miles. Contributions from the boys' lunches were soon heaped in front of him, and Nosey ate all they could spare in double-jig time. When he had finished, someone went over to Greasy Joe's Diner across the street and brought back a mess of fried chicken. Nosey just sort of opened his mouth and the whole chicken just naturally disappeared.

After Nosey had eaten, we gathered all the castoff clothing we could find and gave the collection to Nosey. When he got dressed, he looked something like what the well-dressed scarecrow should wear, but the boys didn't have the heart to laugh at him.

We never did find out the reason for Nosey's desperate journey—except that when Nosey is in the mood to travel no kind of weather can stop him. We figured that must have been the reason.

I heard afterwards that Nosey had inherited $50,000 and had settled down in a home of his own somewhere in the Far West. And it is said that a banner, flying from the top of his house, carried this legend: "To All Who Are Hungry, Stop Here and Eat."

THE MISSING WIRE

This happened in a mill where I worked—so I know it to be the truth, the whole truth, and nothing but the truth—so help me.

One night years ago, when the machine was running nicely, as machines always did i
good old days, Nosey Hill sank down in a p
broke and fell fast and soundly to sleep. We s
have known something awful would ha
We just should have known better. Ther
hardly a time when Nosey Hill lay down to
anywhere near a paper mill that something
didn't happen.

When Nosey awoke, he instinctively look
the wet end. And there he saw what he sa
couldn't believe what he saw, because wh
saw just couldn't be true. But it was. Well,
say Nosey's eyeballs twirled around for
three full minutes—counterclockwise. His
just sort of snapped up straight. And hi
went kind of like a neon light in all dif
colors. His bare toes just seemed to curl up
in the awkwardest way. And then poor
began to twitch and sputter like a lit firecra

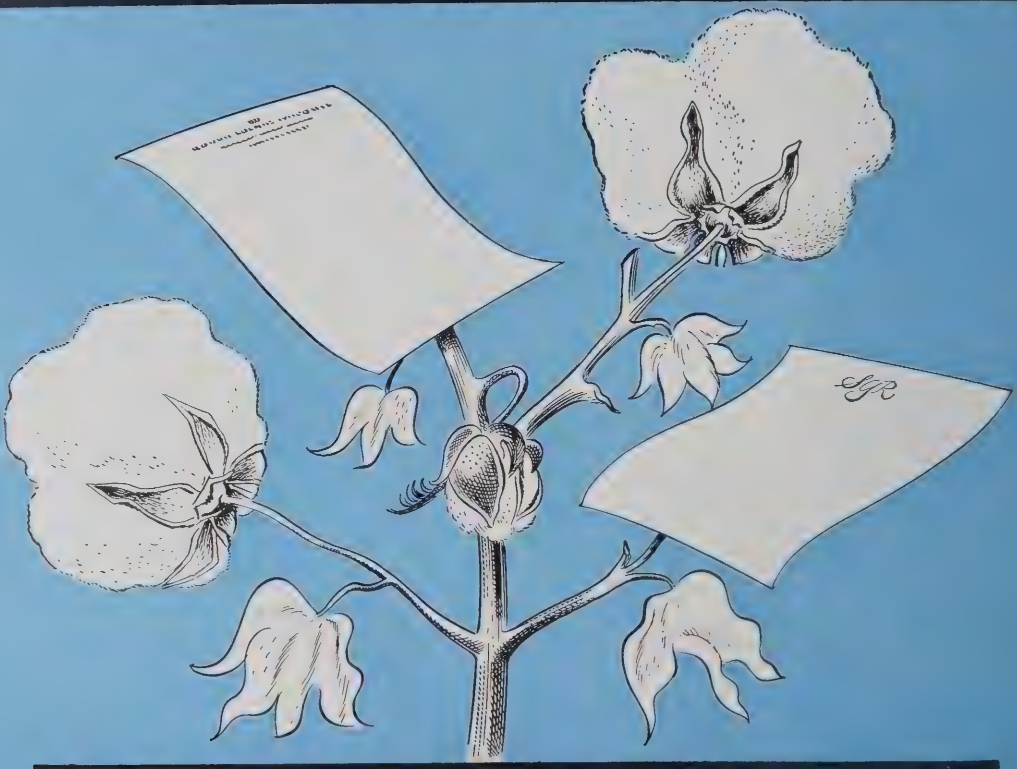
Why?—you ask. *Why?* Why, good hea
man, there was no wire on the machine! The
was dropping into the pit like a waterfall.
denly, Nosey realized it was no nightma
had or the DT's. He rushed down to the w
and there, so help me, wound up on the r
paper, was the missing wire.

What about the backtender and spare h
Why didn't they wake up Nosey when the
what was happening? Well, by the time the
had gone halfway down the driers, it was to
anyway, and they were just too stupefied to
throw the drier clutch. People say about
time of night three strange blue flashes
streaking through town like a trio of low-
comets. I guess the boys just didn't want
around when Nosey woke up.

THE END

The following advertisement appeared in recent trade publications.

in high quality paper the trend is to



cotton linters

Good usable cotton rags for papermaking are getting scarcer, more costly every day. But papermakers do not have to accept less satisfactory substitutes. Hercules Bleached Cotton Linters are rapidly gaining acceptance as high quality extenders for rags. Their performance in rag-content writing papers, for example, is well known. Their clean virgin fibers contribute good color, permanence, feel, bulk, opacity, and sheet structure to the paper. Write for helpful technical information on adapting Hercules Bleached Cotton Linters to your paper processing.

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Casein • Wax Emulsions

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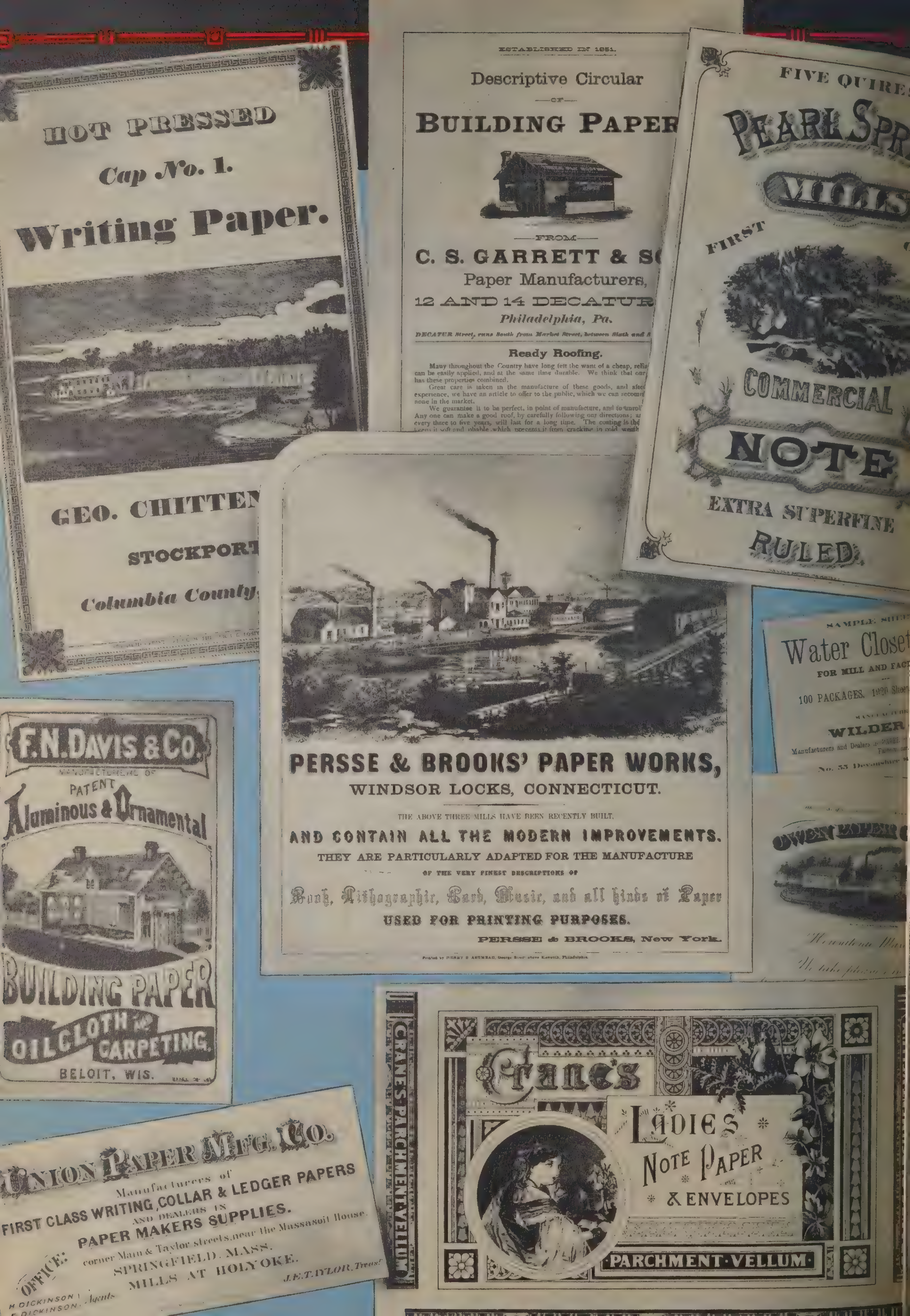
*REG. U.S. PAT. OFF.



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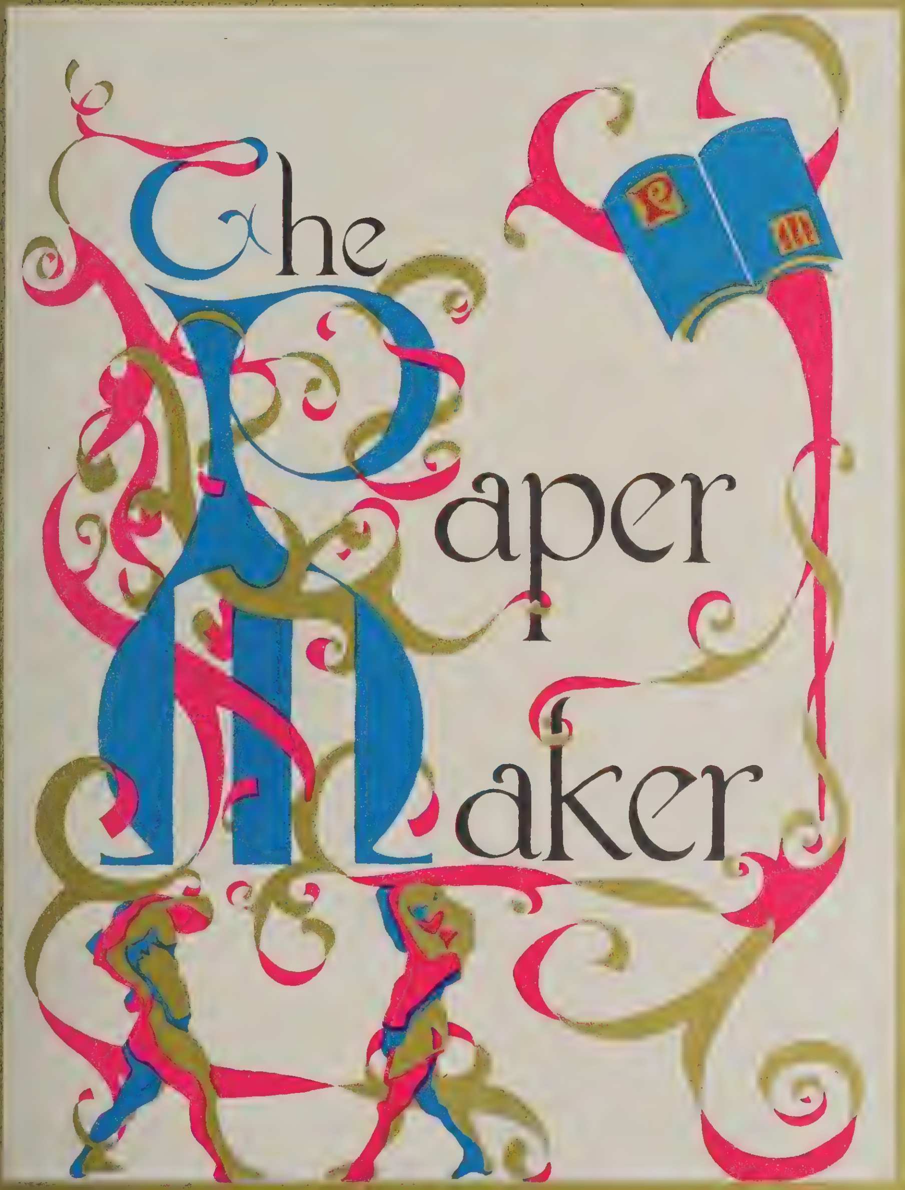
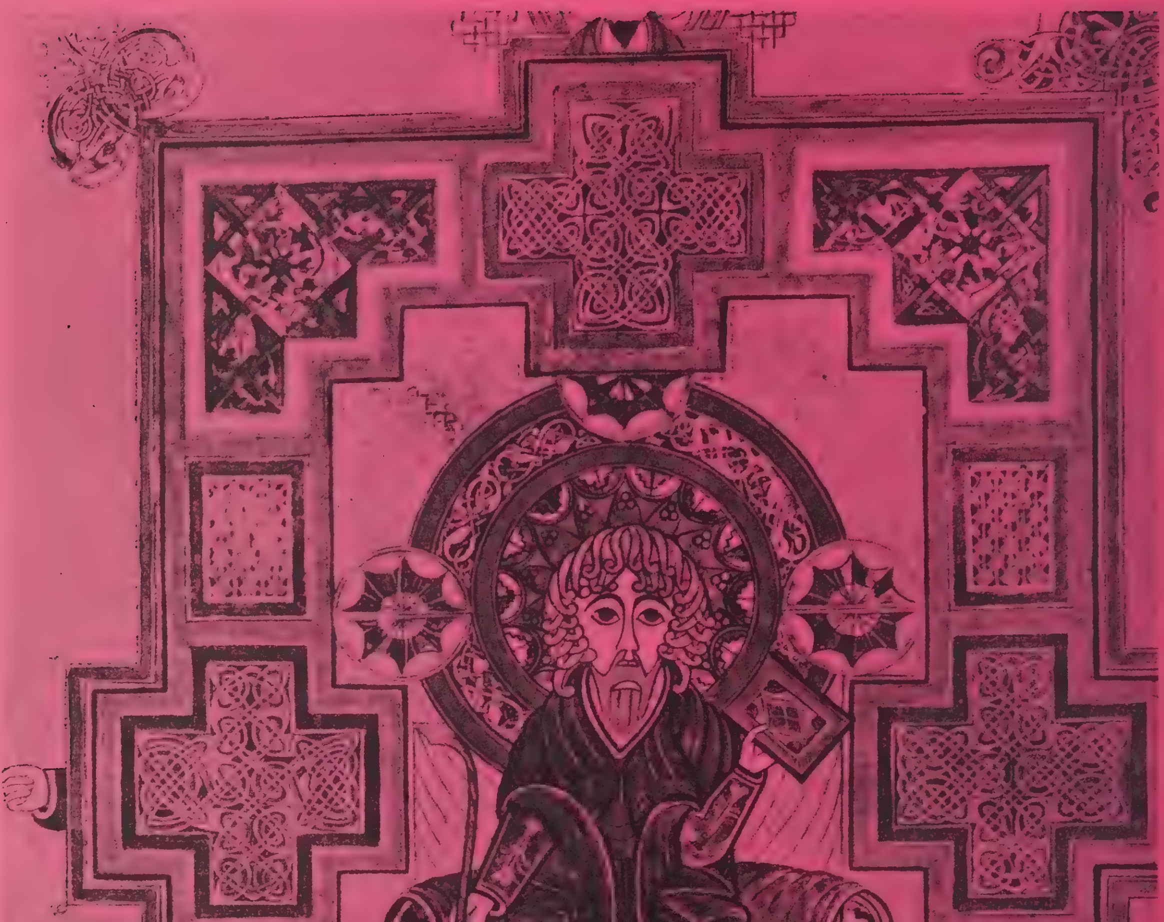


The Paper Maker

Volume 18 · 1949 · Number Two



Portrait of St. John. This page shows clearly, at the top and right, the deplorable result of trimming the *Book of Kells'* pages by a bookbinder, *circa* 1800.

THE PAPER MAKER
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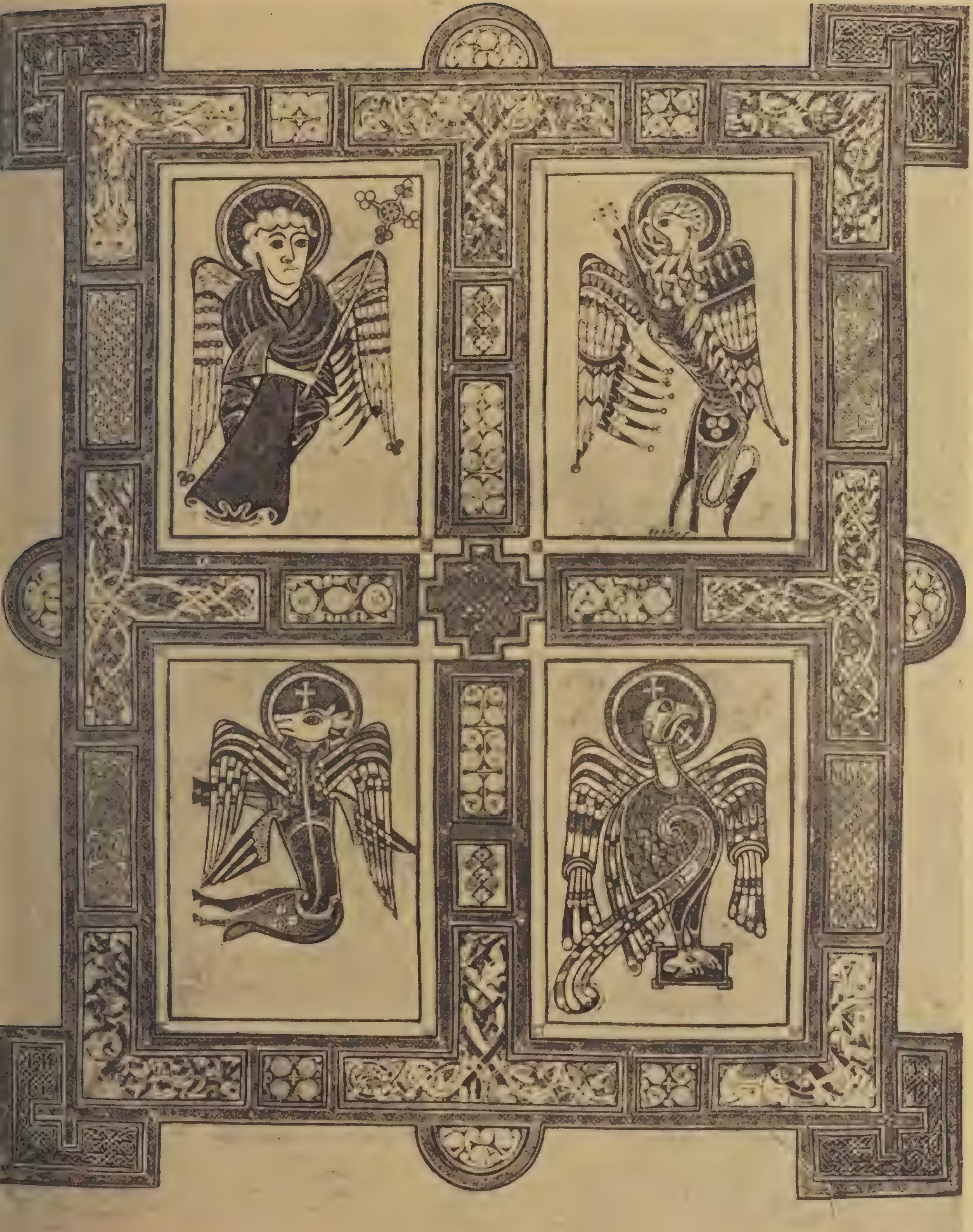
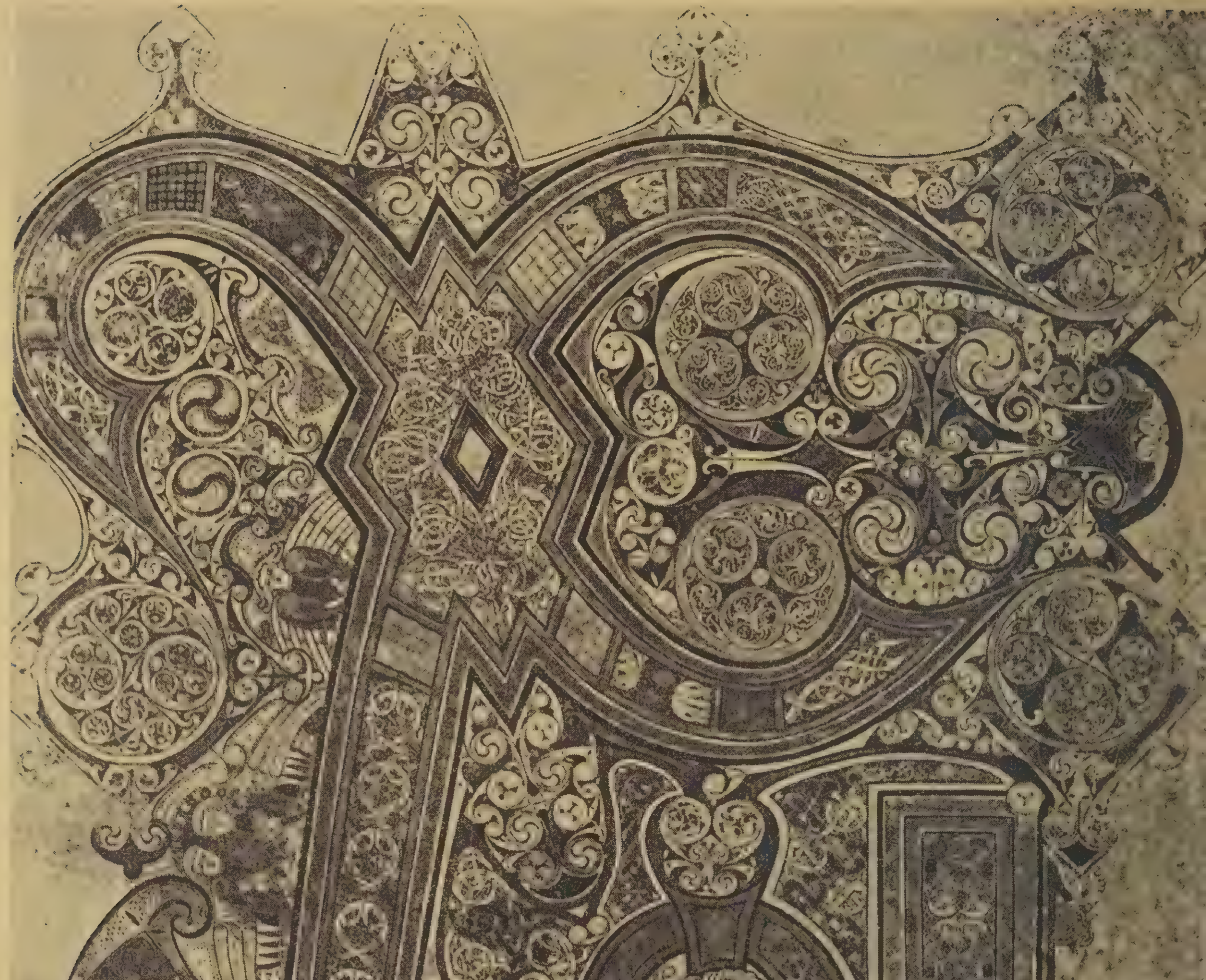


The Evangelical Symbols from the *Book of Kells.* The Man (Matthew)—The Lion (Mark)—The Ox (Luke)—The Eagle (John).



Known as the Monogram Page of the *Book of Kells*, this is said to be the most intricately designed page in existence.

THE BOOK OF KELLS

By Denis Kelleher, b.a.

Mellow with the weight of eleven hundred years, with margins clipped and pages missing, the *Book of Kells* is still hailed "The Most Beautiful Book in the World." It is an illuminated copy of the four Gospels in Latin. Viewed as a mere text, it is full of defects; there are misspellings, unfinished sentences, and several readings not in accord with the official Vulgate. The script, a rounded half uncial about one-third inch high, is clearly meant for long-distance reading. Though beautiful, the handwriting is in no way responsible for the fame of the book. It is in the spaces left by the scribe that interest lies. For illumination in its essence is nothing more than filling gaps with decorations. The plan of the *Book of Kells* entailed decoration on a scale so vast as to make one's head reel. Each tiny pattern gets its quota of imaginative inventiveness so that it flaunts its own individuality and is easily distinguishable from any other of the millions of patterns in the book. So exquisitely firm are the lines, so cunning the weaving of the maze, so intoxicating the clash of brilliant colour against brilliant colour, that we are taken out of the realm of pure decoration to where reigns the very poetry of art.

It is with pleasure that we present Denis Kelleher's story of the Book of Kells, and his notes on the life lead by monks in the early monasteries. Mr. Kelleher, a resident of Dublin, Ireland, is a National Teacher; his vocation together with his place of residence combine to make him an authority on the subject which he presents so ably here.

THE EDITOR.

During the so-called Dark Ages, monasteries throughout Western Europe vied with one another in the production of illuminated Gospels. The monks of the Columban foundations early outstripped their rivals. In the first half of the seventh century came a brilliant but uneven book[1] from the monastery at Durrow. This was soon put in the shade by a flawless book[2] produced by the Columban monks of Lindisfarne in North Wales. Yet there was better to come, and with the *Book of Kells* was born a richness of artistic vision till then unknown.

The *Great Book of Columcille*, as it was originally called, may have been begun in

The library of Trinity College in Dublin was built in 1712-1725, and is the oldest of the large buildings in the college. In this library is kept the *Book of Kells*.

---

[1] The *Book of Durrow*, preserved, Trinity College, Dublin.

[2] The *Book of Lindisfarne*, preserved, Cambridge University, Cambridge.

Iona, and brought to Kells soon after 800. Because of Viking raids, the monks left Iona then and sought sanctuary with their fellows in Kells. In succeeding centuries, the kings of Meath found it increasingly difficult to keep the peace within their own frontiers and Kells was no longer inviolate. Dealing with the events of the year 1007, the annalists report:

"The *Great Book of Columcille*, the chief *relic* of the Western World was wickedly stolen in the night, and after the lapse of two moons and twenty days was found under a sod with its jewelled and golden cumhdach[3] gone." So even at that date it was old enough to be called "relic." Having been restored to the monastery, it remained there undisturbed until the Reformation.

In the autumn of 1541 the monks were dispersed and were replaced by military-minded men who took pride in neither asking nor giving quarter. Always on the alert for the call to battle, they had little time for the cherishing of cultural relics. Religious objects in gold were melted down and priceless antique volumes destroyed or exposed to the elements. For any that were preserved thanks is mainly due to James Ussher, the new Protestant Archbishop of Dublin. This discerning scholar set about collecting works of merit regardless of whether they were "heretical fulminations." By 1640 his library numbered 10,000 volumes, among them the *Book of Kells*. He wished to leave the collection to Trinity College but owing to theological differences with the Puritan government, he was imprisoned in England and all his goods escheated to the state. He died in 1655, and his books were put up for sale. Among the tentative purchasers were the King of Denmark and Cardinal Mazarin, but eventually the lot was bought for £2,200 on behalf of Trinity College. This displeased Cromwell the Protector and to prevent the college's having the books, he ordered that they be stored in Dublin Castle. In this place they were badly housed and carelessly guarded. Several were ruined by damp. Many more were stolen for the value of their gilt. The *Book of Kells*, deprived of its cumhdach, did not tempt the thieves, but for lack of a proper cover five of its pages were lost.

In 1660 came the Restoration and King Charles released the impounded books. In accordance with the wishes of the Archbishop, what was left of his library was transferred to Trinity College.

The *Book of Kells* lay for a long time in the college library without attracting any widespread attention. About the year 1800, somebody thought it worthwhile to have it bound. Unfortunately, the bookbinder of his choice had a passion for straight edges. Else he had a ready-prepared cover somewhat smaller than the manuscript. At any rate, he neatly trimmed the pages all round. In doing so, he light-heartedly clipped the edges of many designs, beheaded more than one portrait, and removed marginal interlacings from every page. The result of his unconscious vandalism is that today not one square millimeter of manuscript would be made available for scientific research. Depend on it, the present custodians will ensure that there are no further mutilations of their treasure. Neither is it likely that it will be "wickedly stolen in the night," for each evening it is locked below in the strong room. In the morning it is taken out and, reverently, the assistant librarian turns over a new page to be left on display for the day. One way, therefore, of seeing the whole book is to visit the library every day for 339 days, for that

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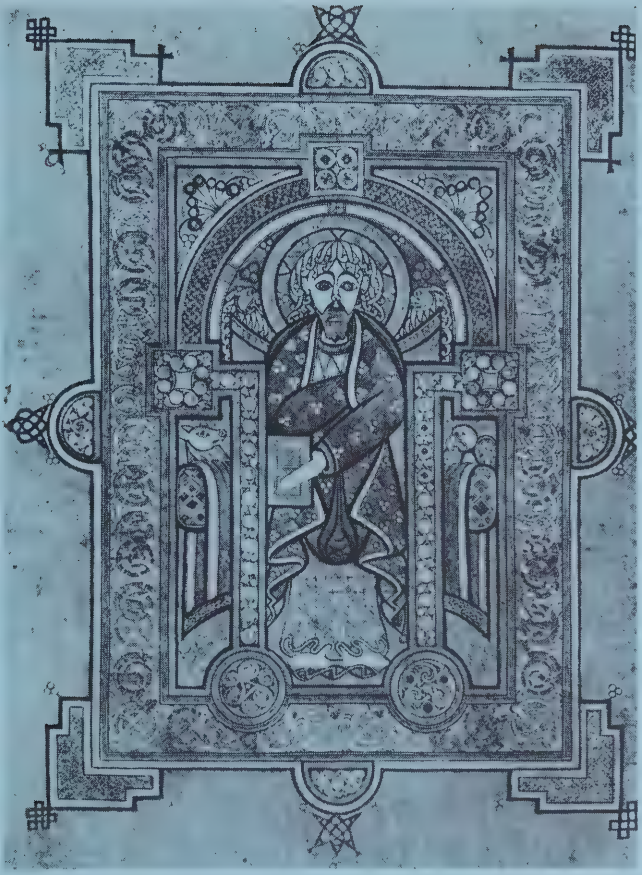
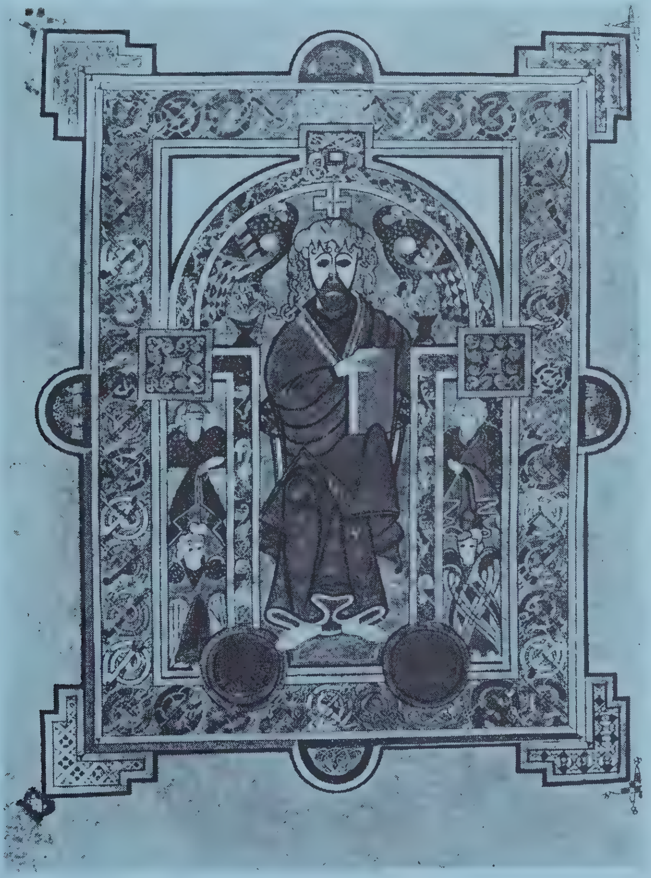
[3] Gaelic word for shrine, or reliquary. Pronounced "Koo'dagh."

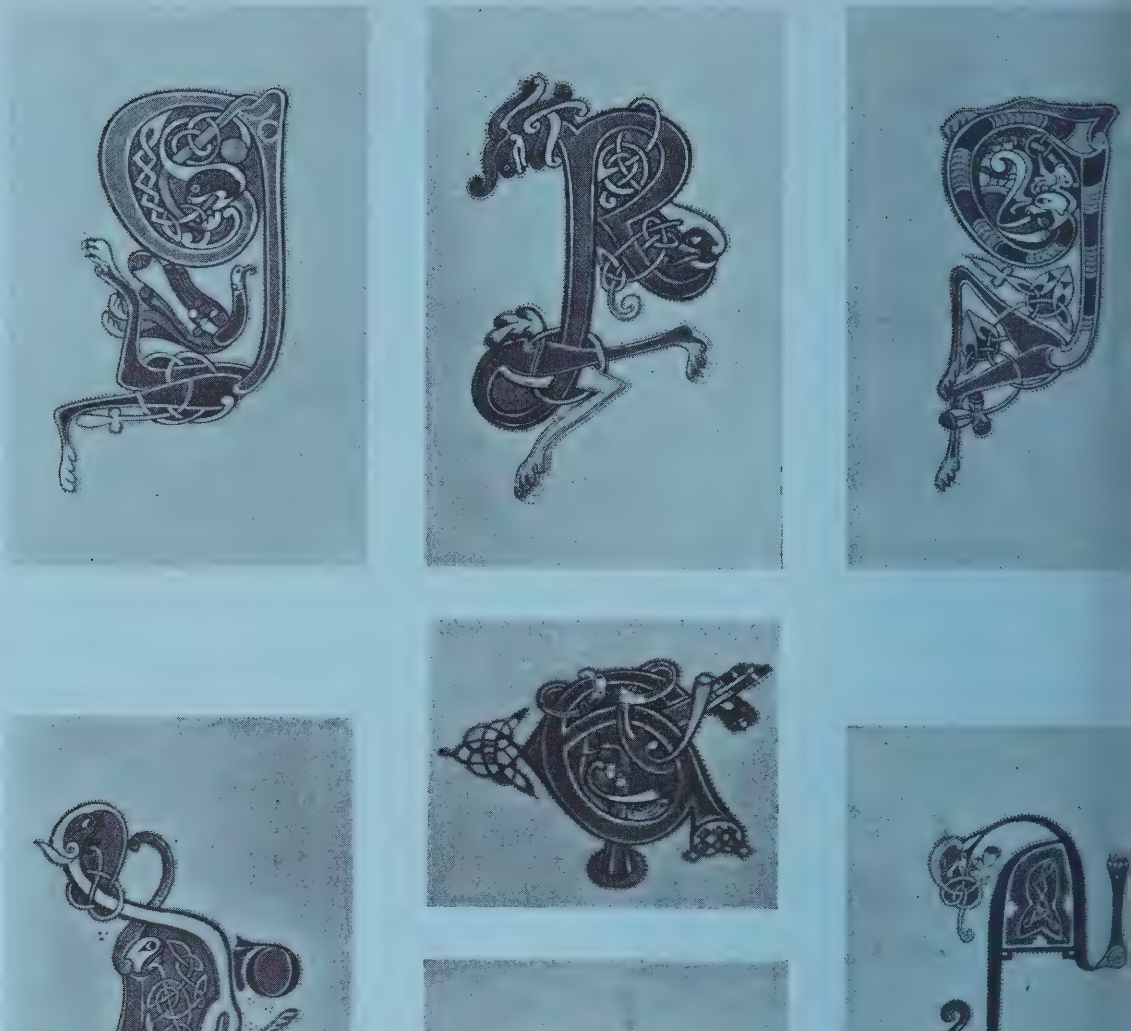
Portrait of an Evangelist,
probably St. Mark.



"Qui dixit"



The portrait of either
St. Mark or St. Luke.



Animated letters as copied from the *Book of Kells.* Starting from the upper left and reading across and down we find: Q, R, Q, ET, AD, AD, AI, AT, TRadat, S, and DICO.

is the number of pages now left. Professors of letters and art, designers looking for patterns, the ordinary Tom-Dick-Harry tourist, all come to stand and gaze and gape, according to their bent. One and all are treated to a full historical survey and to a minute appreciation of the artistic technique. Visitors' questions, whether scholarly or silly, are painstakingly answered, for Mr. Hanna and his assistant are the most patient and courteous of men.

Even in pages of plain script there is always something to astonish both professor and tourist. Capitals are never mere letters. For the most part they "are made of the brightly-coloured entwinements of birds, snakes and quadrupeds fighting and performing all sorts of acrobatic feats."[4] That no animated capital is treated in the same way twice shows inexhaustible inventiveness. That no motif ever descends to the obvious or naive shows a keenly critical aesthetic sense. With tail taut, a shark fish shoots to cross a big *F*. For no orthographic reason a cat chases a mouse round an *O*. Powerful hounds scamper in open spaces and a daring horseman leaps over a line. A *P* looks with disapproval on puny warriors tilting spears. The peacock, figure of Death, walks beautifully aloof while the greedy cormorant purloins a *U* for its nest. As in all pre-renaissance works, the figures are drawn in bold and sharp outline, without background or depth. The technique of filling in with spirals and parallel lines was then an accepted convention, just as shading and perspective became part and parcel of a later school.

The collection of animals, birds, and fish throughout the text is apparently the work of one hand, a master in his own field. The fully illuminated pages required gifts of a different order, and in these the work of three artists may be detected. These pages were left entirely blank by the scribe so that important events might be more strikingly

Here in the library of Trinity College is displayed the *Book of Kells.* Brought from the strong room each morning it is placed on its stand, behind the figure in the center of the room. This room, 209 feet by 40 feet, is said to be one of the longest, if not the longest, rooms in Europe. It contains more books than does any single room in the world, a total of some 300,000 volumes, including Egyptian papyri, manuscripts in Gaelic and Latin, specimens of early printing, and rare works in many languages.

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[4] Henry, Françoise, *Irish Art in the Early Christian Period*, page 141, Methuen & Co., 1940.

presented to the reader. The letters of the central word or phrase were enlarged by the artist to form a framework around which he could weave the most elaborate designs. "Inside these legible frames, out of them, around them flows in a continuous stream a fantastic decoration of minute spirals endlessly interlocked with each other, animal bodies plaited and knit, snakes twisted into patterns of eight, little men so ingeniously folded and bent inside a circle that they look like geometrical figures gone crazy. The delicacy of his work is incredible. He can wind spirals to such a point that their thread is only barely visible. He never blunders over an interlacing, however miscroscopic, and keeps his string imperturbably going up and down."[5] That the illuminated work may not be as readily legible as the plain script did not unduly worry the artist. Rather he made it his glory, as Joyce gloried in the unintelligibility of *Finnegans Wake*. Who would see the second *i* of Principio in a little round-headed man in blue whose long arms reached out to play the harp on a stringed *C*? Perhaps even then, art was for the exclusive few, for the initiate.

[5] *ibid*, page 145.

MATERIALS

The sheepskin vellum, of a good thickness, well glazed and polished, is written upon on both sides. The pages now measure 13 inches x 9½ inches, and before cutting might have been 15 inches x 12 inches. The black script ink, probably a charcoal product, is still as black as anyone could desire. The script was almost certainly executed with a goose quill. Much of the illumination was also done with a quill but with regard to the finer spirals and interlacings, experts differ. Some maintain they are the work of metal-pointed instruments; others are equally sure they see in them the work of fine brushes. Françoise Henry is of the opinion that good-quality brushes made from marten hair have long been in use in Ireland.

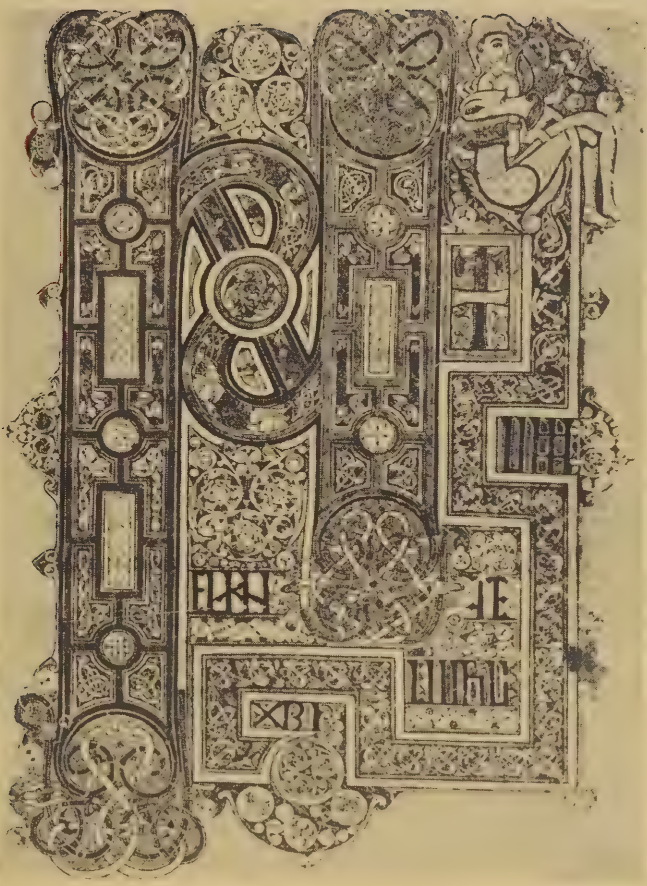
The luster of the pigments is such as to be incongruous against the venerable mellowness of the vellum. The colours mostly used are green, red, black, and yellow with some blue and purple. The green was anciently got from malachite, a copper alloy found in Cork and Limerick. The blue is like lapis lazuli and if it really is, may have been brought from Persia. The similarity between the Irish and Byzantine styles of illumination, as opposed to the Romanesque style, bears this out. Gold was used in its pure form and may also have a part in the mixing of the purple. The red may be a natural hematite.

Similar colours are common in other manuscripts that have survived from that period. But in succeeding centuries the unsettled state of the country, because of Viking wars and internal dissensions, precluded the practice of art. The decorative skill passed away and with it the secret of preparing everlastingly brilliant pigments. Kells is no more. Of the monks, there is no trace. The *Book* is all that remains; its pages giving silent testimony of bygone sanctity and aesthetism. Its mutilations are only too vocal—they cry out against lawlessness and barbaric war.

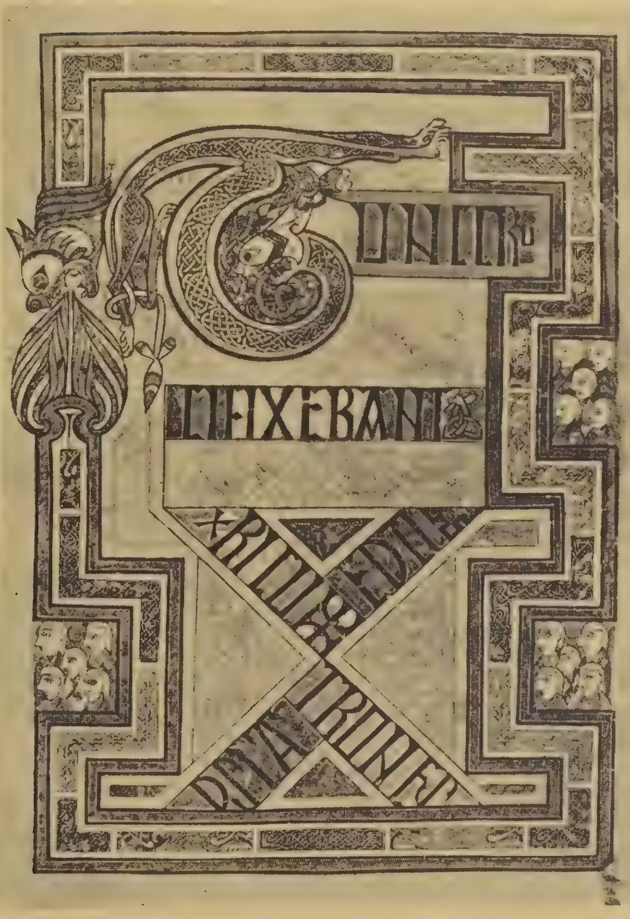
LIFE IN THE COLUMBAN MONASTERIES

Monks generally are not given to memoir writing. Of those who worked and prayed in Kells not a name, hardly a story, remains. Of the monastery building there is no trace.

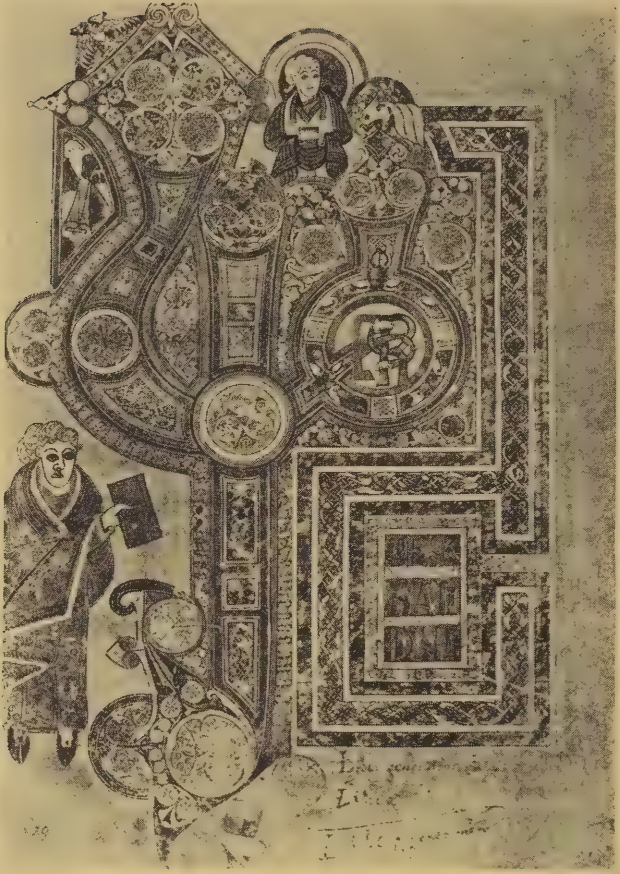
From St. Mark's Gospel,
Verse 1, Chapter 1.



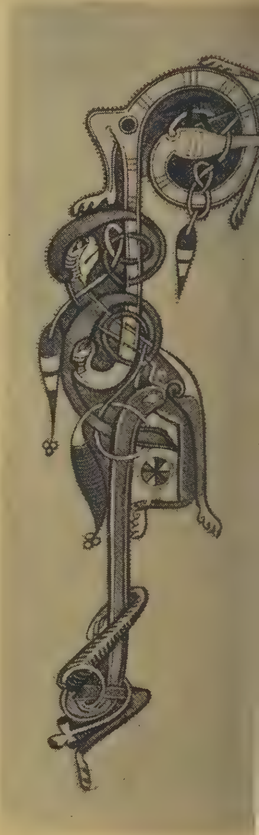
"CAvete"



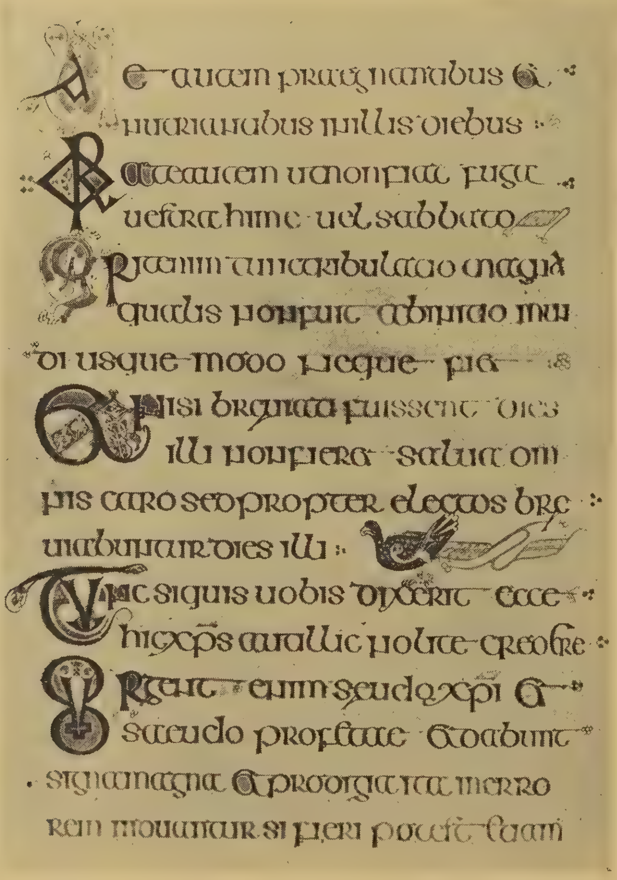
"Tunc crucifixerant Xpi
cum eo duos Latrones"



From St. Matthew's Gospel, the words on this page are "Liber Generationis." Note where the later-day bookbinder trimmed the portrait.



The animated letter P



Ue autem praegnantibus et
nutrientibus in illis diebus
Orate autem ut non fiat fuga
uestra hieme uel sabbato
Erit enim tunc tribulatio magna
qualis non fuit ab initio mun
di usque modo neque fiet
Et nisi breuiati fuissent dies
illi non fieret salua om
nis caro sed propter electos bre
uiabuntur dies illi
Tunc si quis uobis dixerit ecce
hic xps aut illic nolite credere
Surgent enim seudo xpi et
seudo profetae et dabunt
signa magna et prodigia ita ut in erro
rem inducantur si fieri potest etiam

An example of the beautiful, rounded half-uncial script. The original is about one-third inch in height.

Situated as it was within the ambit of spoilation wars, there was not left a stone upon a stone. But it must surely have been built on a plan commonly found in ruins in more remote parts of the country. This simple plan entails a central oblong oratory surrounded by a great number of cells, usually round in shape—one for every monk. The walls were of wood or of mortarless stone. Inside there were recesses but no fireplace. A fairly common feature is a number of protruding pegs about shoulder-height. These may have served to hang up food and books away from the rodents that surely sheltered in the multi-creviced wall. Of all animals sketched in the illuminations, the cat is the most naturalistic and alive. Perhaps that was because the artist had a model purring at his elbow.

There was at least one monk who broke the general rule and wrote something personal on the margin of his vellum. It was nothing less than a mock-heroic ode to his cat:

"I and Pongur Bán my cat,
'Tis a like task we are at;
Hunting mice is his delight,
Hunting words I sit all night.

"'Gainst the wall he sets his eye
Full and fierce and sharp and sly,
'Gainst the wall of knowledge I
All my little wisdom try."[6]

To complete the picture of the lonely cell life of the Irish monk, there is the story of Mochua. This young protégé of Columcille, though faithful to his vow of poverty, kept as many as three pets. They were a cock, a mouse, and a fly, and each had its special duties to perform. In the morning the cock crew to announce the time for matins. When their master, exhausted from continuous writing, fell asleep at his desk the mouse came and nibbled at his ear. And behold the faithful fly stood on the word where Mochua had left off so that he could straightaway resume his transcription task. These three "valuable possessions" died and Mochua, in sorrow, wrote to his preceptor, Columcille. The reply was terse yet full of monkish wisdom:

"There can be no losses except where there are possessions."

From examination of ruins elsewhere and from the foregoing anecdotes, we may safely conjecture that monastic life in Kells was austere and simple. Having renounced the world, the monks did not begrudge length of days spent in beautifying the word of God. Patient practice brought unparalleled firmness of hand, visual clarity in following intricate pattern, and exquisite taste in the matching and contrast of colour. Above and beyond all that, heartfelt devotion brought its own reward, the stirring of a responding chord in all those who, with sympathy, gaze upon their work.

A complete reproduction in facsimile will, for the first time, be published in 1950. The photography and processing are by Urs Graf Verlag, Berne, Switzerland. The first edition is limited to 400 numbered copies in two vellum-bound volumes. The price will be in the region of £90.

Reproductions from the *Book of Kells* and photographs of college buildings by kind permission of the Librarian, Trinity College. Animated capitals after copies by Mrs. John D'Olier. Pages taken from The Book of Kells Studio Ltd., 1914. Photostat prints by The National Library, Kildare Street, Dublin.

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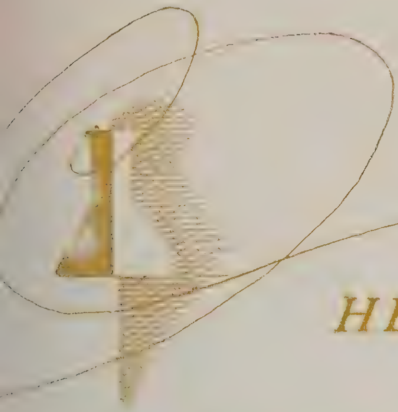
[6] Literal translation by Dr. Robin Flower.

Electron micrograph of aluminum monohydrate crystals magnified 15,000 diameters. Made during the study of alum sizing.



recent HERCULES developments

Paint removers have increased in importance in recent years. Practically every industry which applies protective coatings makes some use of paint removers. Hercules* Cellulose Acetate is used as a bodying agent in some of the better types of modern paint removers. In such paint removers, chlorinated solvents are used as solvent for the acetate and to reduce fire hazards, as well as to soften the paint film to be removed.

Recent tests have verified past experience in that addition of some nitrocellulose to shellac definitely improves (a) water resistance, (b) scrubbing resistance, (c) abrasion resistance, and (d) drying time. Also even a little low-viscosity nitrocellulose can materially increase the body of shellac solution. Of course, an active solvent must be used along with the alcohol to get the nitrocellulose into solution. Ethyl acetate does this job nicely, with no harm to odor.

Ethyl cellulose can be used advantageously in specialty lacquers, including hard lacquers for rigid surfaces and tough lacquers for nonrigid surfaces. For details, see the recently issued, revised edition of "Hercules* Ethyl Cellulose—Properties and Uses," pages 46 and 47. If you do not have a copy of this 60-page booklet, one may be obtained upon request.

Three-quarter-second RS Nitrocellulose is now available and should be of interest to all lacquer formulators. It is of interest where nitrocellulose of a viscosity between ½-second and 5-6 seconds could be considered. For example, where a ½-second RS Nitrocellulose is now in use in wood furniture lacquers and some improvement in cold-check resistance is desired, the ¾-second type should be considered.

Information on Hercules* CMC (cellulose gum) has been brought up to date in a recently revised and issued booklet. New uses continue to be found for this water-soluble cellulose product. Among its numerous uses are those in which it serves as a stabilizer of emulsions, foods, pharmaceuticals, and industrial products. It is used, also, as a suspending agent, for example, in water paints. This property of holding in suspension finely divided particles led to its use in detergents to prevent redeposition of loosened soils.

Pine oil can be used as an effective leafing agent for aluminum powder in resin emulsion vehicles. All other commonly used leafing agents for bronze powders failed when tried for this particular usage.

*REG. U.S. PAT. OFF.

PIONEE

PAPER MILL

OF THE WEST

By Florence Donnelly

UILDER of an industrial empire in Marin
County, California, in the 1850's was Samuel
Penfield Taylor. In the face of almost insur-
nountable difficulties, he built the first paper
nill west of the Mississippi. With the mill as its
oint, the picturesque community of Taylorville
-and the founder of it all saw his dreams fulfilled.
people today know of the mill or Taylorville
he little nearby settlement, Irving, to which
gave the maiden name of his young wife.
er, the name of the empire builder has been
ated by the Samuel P. Taylor State Park, on
the ruins of the mill stand. Beyond Papermill
the picturesque stream, which runs through the
nd the Sir Francis Drake Highway, is a small
There lie the remains of the pioneer whose
nercifully came before the business he had built
e of the leading industries of the West crashed,
vast acreages he had owned passed out of the
ion of his family.

at Saugerties on the Hudson in New York
amuel Penfield Taylor was the youngest of a
mily. He was but a youth when news came of
ing of gold at Coloma in northern California.
number of friends of the same adventurous
s his own, he fitted up an old schooner in
Early in the summer of '49 he and his friends
or California. Ten months later, they disembarked at Yerba Buena (San Francisco), having sailed around Cape Horn and stopped at many ports to make repairs on their old ship. Although neither he nor his companions suffered injury on that eventful voyage, it made a lasting impression on Taylor. He said many years later, "The payment of $20 for the privilege of working one's way around Cape Horn, before the mast, was not what it was cracked up to be."

Most of the party went immediately to the gold diggings, but young Taylor's funds were about exhausted, so he set out to make a "grubstake." Opportunity had to knock at his door only once. A hogshead of eggs floated through the Golden Gate into the bay. The youth salvaged it, bought a small stock of bacon, and with the hogshead as his counter opened an outdoor-eating place. The venture was profitable, and in a short time Sam Taylor set off to the mines. In August, 1852, he shipped to Curtis, Perry and Ward, bankers in San Francisco, enough gold dust to net him $5,691.99. He returned to San Francisco and in 1853, with Isaac Cook and Henry Weatherbee, he opened a lumberyard on California Street, near Drumm.

Arrives in Marin County

It was soon after that Taylor came to Marin County looking for lumber. In a small boat he crossed San Francisco bay, and then on horseback (securing a

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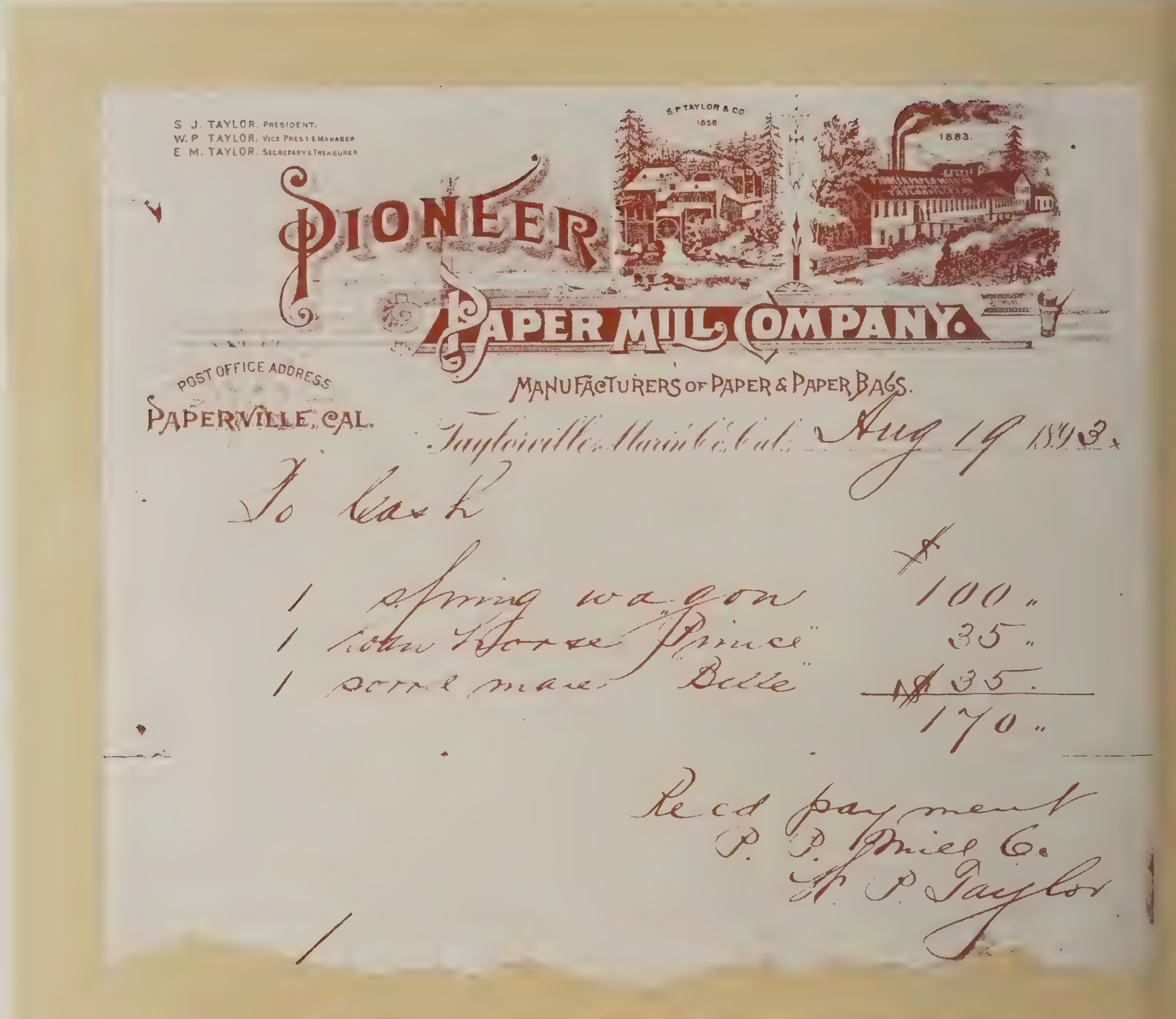
ence Donnelly is a California newspaperwoman, a member of the staff of the San Rafael Independent at San Rafael, Marin County.
wealth of information about early Western paper mills and we hope to present other articles by this same author.—The Editor



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E. M. TAYLOR, SECRETARY & TREASURER

S. P. TAYLOR & CO
1856

1883.

PIONEER PAPER MILL COMPANY.

MANUFACTURERS OF PAPER & PAPER BAGS.

POST OFFICE ADDRESS
PAPERVILLE, CAL.

Taylorville, Marin Co, Cal. Aug 19 1893.

To Cash

1 spring wagon	$ 100.
1 roan Horse "Prince"	35.
1 sorrel mare "Belle"	$35.
	170.

Rec'd payment
P. P. Mill Co.
W. P. Taylor

The Pioneer's letter form, illustrated with pictures of its two mills.

horse from a rancho) he went over the slopes of Mt. Tamalpais and followed the streams to what is now Papermill Creek. The area abounded in a great variety of trees, but the giant redwoods and oaks interested him most.

Realizing the great possibilities of the country, the natural beauty, the amount of timber, and the water power, Taylor purchased 100 acres of land from Rafael Garcia, owner of a huge grant of land. Because Taylor's people had been interested in a paper mill near Catskill, New York, and he was familiar with its operation, he decided he had found an ideal location for one.

Many men of judgment thought his idea fantastic. The site was almost inaccessible other than by cutting trails over the mountains and hills and tra horseback. Machinery had to be brought fr East, and it and other heavy equipment had carried over mountainside and hills by oxcart. B the water power was low during the summe wages were inordinately high in California co to those in the East where Taylor was to hav petition with well-established business.

But the young man was undaunted. The fir in carrying out his enterprise was the construc a "saw pit." Here the lumber for the mill, dw and boardinghouse for the workers was whip from redwood trees felled nearby. The timbers squared and framed in the clearing for the mill a together with wooden pegs. A log dam, a m

eek, was begun to insure sufficient water power.
h the work well under way, Taylor returned to
st in the summer of 1854, taking the Isthmus of
na route. He went to South Windham, Con-
ut, where he purchased the machinery of Smith,
ester and Co. After starting it on its way to
rnia, he forgot business for a while and went to
iver, Massachusetts, to continue his courtship of
Washington Irving, a pretty schoolteacher. They
narried in the spring of 1855, and he brought
ide to California by the Nicaraguan route.

hing remains of the fine home which Samuel
built for his wife and where their seven sons,
Samuel, Edward, William P., George, Frank,
and their daughter, Maybelle,
eared. However, the site can be
d because the apple trees in the
orchard, just a stone's throw
he mill ruins, are still growing.

machinery had been shipped
e Isthmus; on arrival in San
sco, it was sent by schooner to
s, an early-day shipping point
rin County. It was then taken
cart part of the way and then
ed" by "ox power" to its
ation.

h the machinery installed, the
completed, and the raw materi-
hand, the water was turned on
o large overshot wheels and
ll was in operation in Novem-
56.

site of the mill was not chosen
water power alone, for the
of the water was also a deter-
factor. As is well known, a
upply of clear, pure water is
olute necessity in the manu-
of paper. Steam was also
ry for cooking the stock and
dryers. This was generated by
. During the many years the
as in operation, the necessary
for fuel was cut from the
l 100 acres and from the 2,500
which, as needed, were added
Taylor property.

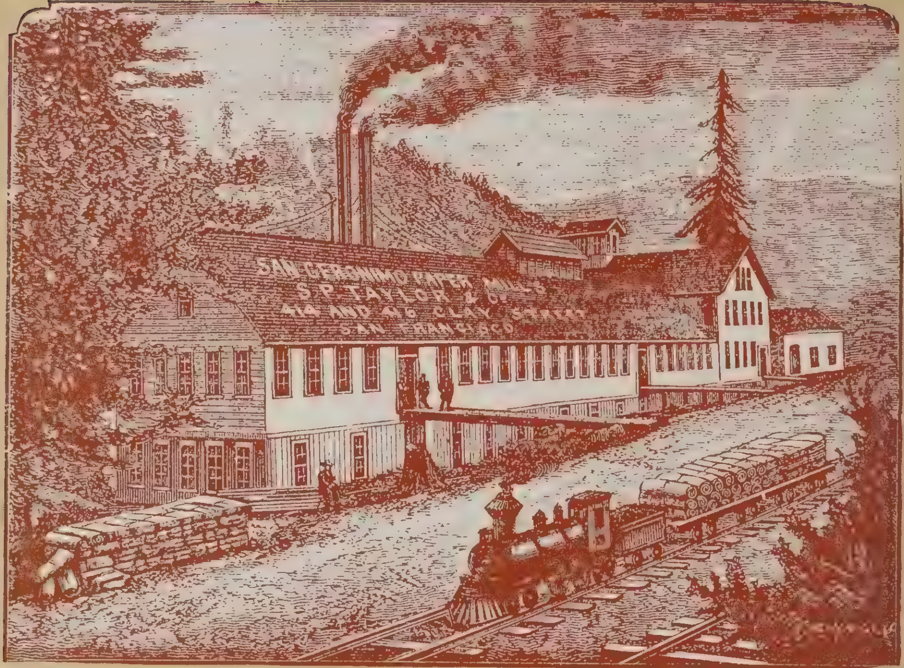
chief product of the mill in
y days was newsprint. It was
rom rags retrieved from the
and dump piles in San Francisco by the thrifty Chinese. The Orientals, using two-pronged sticks, picked up the rags which they shoved into the bags they carried balanced on bamboo poles over their shoulders. The Chinese sold to the junkmen who baled the rags.

The merchants of San Francisco took pleasure in aiding the infant industry, known for a short time as Taylor and Post, although many of them had little idea that it would prosper and grow as it did.

"Hold the Presses"

With transportation today so simplified and communication so speedy, it is interesting to contrast the situation now with that of nearly a century ago.

At Camp Taylor, in 1880. The gigantic redwoods and beautiful stream made this an ideal vacation spot.



The second paper m
built by Samuel Penfie
Taylor. It was constru
ed in 1883 because t
first mill, built in 185
did not have sufficie
capacity to satisfy c
mands of the rapidly e
panding business.

Not only did Taylor have difficulty in getting his supplies to the mill but in getting his product to his best customers, the San Francisco newspapers.

The lookout at the top of Telegraph Hill, who kept San Franciscans informed on the arrival and departure of ships, would be besieged by the *Alta California*, *The Bulletin*, and *The Call* when they were short on newsprint. The query was: "Has the sloop from Bolinas yet hove in sight?"

Taylor was constantly struggling to overcome transportation difficulties. However, it was not until the '70's when the North Pacific Coast Railroad was built that the products of the mill could be sent speedily to the customers. The railroad line came directly through the Taylor property.

Step by step, the pioneer in the papermaking industry in the West built up his business. He introduced paper bags which were then novelties. He entered also into the business of making "fine papers." In 1860, eastern paper suddenly rose three or four times in price, which caused the prices of Taylor's products to advance accordingly. After the War Between the States the pioneer mill continued to be one of the best-paying properties in California.

The exhibits of the Taylor products were featured at the annual fairs of the Merchanics Institute in San Francisco and in the offices of "S. P. Taylor and Co., paper dealers and manufacturers of Taylorville and
Clay Street, San Francisco." Bookpaper, whit
tinted, machine-finished, and manila wrapping
won many awards for the firm.

Because his business had increased greatly, T
built the second and much larger mill in 1883
cost of $165,000. The new building was in the
of an "L," with a separate structure for the b
boiler and another for the engines. The main buil
three stories and basement, was 30 feet by 90 feet
upper story was used as a stock and dust room
middle one was for sorting and preparation of
on the lower floor was the pulp room; and the
ment contained the drainers and bleaching vats.

The motive power consisted of a 30-inch L
turbine water wheel, and a Corliss automatic c
engine of 150 horsepower.

Water Diverted

When the Marin Water Company was started i
early '70's, a large amount of the water which
flowed through Papermill Creek went into the
pany's reservoirs. This made it necessary to a
steam engine at the paper mill for additional p

William T. Coleman of San Rafael, who had
chief of the famed Vigilantes of San Francisco's
days, and who was much interested in getting
to his extensive properties in San Rafael, Marin Co
seat, paid Taylor $10,000 for a part of the la

n rights. The mill owner realized later that no
t of money could ever make good the loss to
per mill caused by the diversion of water, or
nsate for narrowing the picturesque stream.
p Taylor, one of the first "tented cities" in
nia, was a noted camping and picnic resort,
efore and after the railroad was built. The
ian Club, exclusive club for men in San
sco, had its first outdoor "jinks" at Camp
in June, 1878.
near the mill, a two-and-a-half-story hotel
ilt, and it was oper-
or many years by
Taylor, son of the
mill builder.
the mill continued
sper. All kinds of
were manufactured—
paper for the State
lifornia, book and
aph paper, manila,
int, wrapping paper,
and fruit wraps. To
them, jute was im-
from Calcutta, wood
rom Norway, rags
ood shavings from
rancisco, and even
aste from the jute
San Quentin Prison,
is in Marin County,
ocessed for paper.

William P. Taylor, son of Samuel Penfield Taylor. He and some of his brothers conducted the business after their father's death.

th Ends Career

death came to end
eer of Samuel Pen-
aylor. After months
s, he died in January,
the age of 58. Mrs.
Baker of San Rafael,
ddaughter, recalls her mother, Mrs. Joseph
Danner (Maybelle Taylor), telling of the
Mrs. Danner was ill and unable to go to the
lace on the knoll, but she watched the sad pro-
The Episcopal bishop walked beside the coffin
vas carried by long-time friends of the pioneer.
of mourners stretched from the valley to the
he hill. In it were men prominent in political
the financial world, and the mill hands who
own and loved Samuel Penfield Taylor as he
d for and achieved success. Beside him on the
e the bodies of his two sisters. His widow
made her home with Mrs. Danner in San Francisco until her death.

William P. Taylor, who later became Marin County sheriff, with several of his brothers continued to operate and improve the mill. A 20-horsepower machine for supercalenders was added to the plant at a cost of approximately $10,000. Hardly had it been installed when the financial panic of 1893 was under way, and the paper mill and many other industries never recovered from it. The property was taken over by Alexander Montgomery. On his death, his widow, Elizabeth, came into full possession of the mill and the lands. She married Attorney Rogers some time later and has lived in a San Francisco hotel for many years. The paper mill was never operated after the Taylors left, and the buildings were badly in need of repair. The paper mill was destroyed by fire in May, 1916. For many years the water wheel stood—a picturesque spectacle. Now all that remain are portions of the foundations, the supports for the heavy machinery, and walls which encased one of the shafts. The hotel, too, burned to the ground.

Because Mrs. Rogers' taxes on what was the Taylor property were delinquent for a long period of time, the County of Marin finally acquired the title and, with cooperation of the State of California, the lands have been preserved for the public by establishment of the Samuel P. Taylor State Park.

Gone are all the children of the pioneer. There were 24 grandchildren but death has depleted their ranks, too.

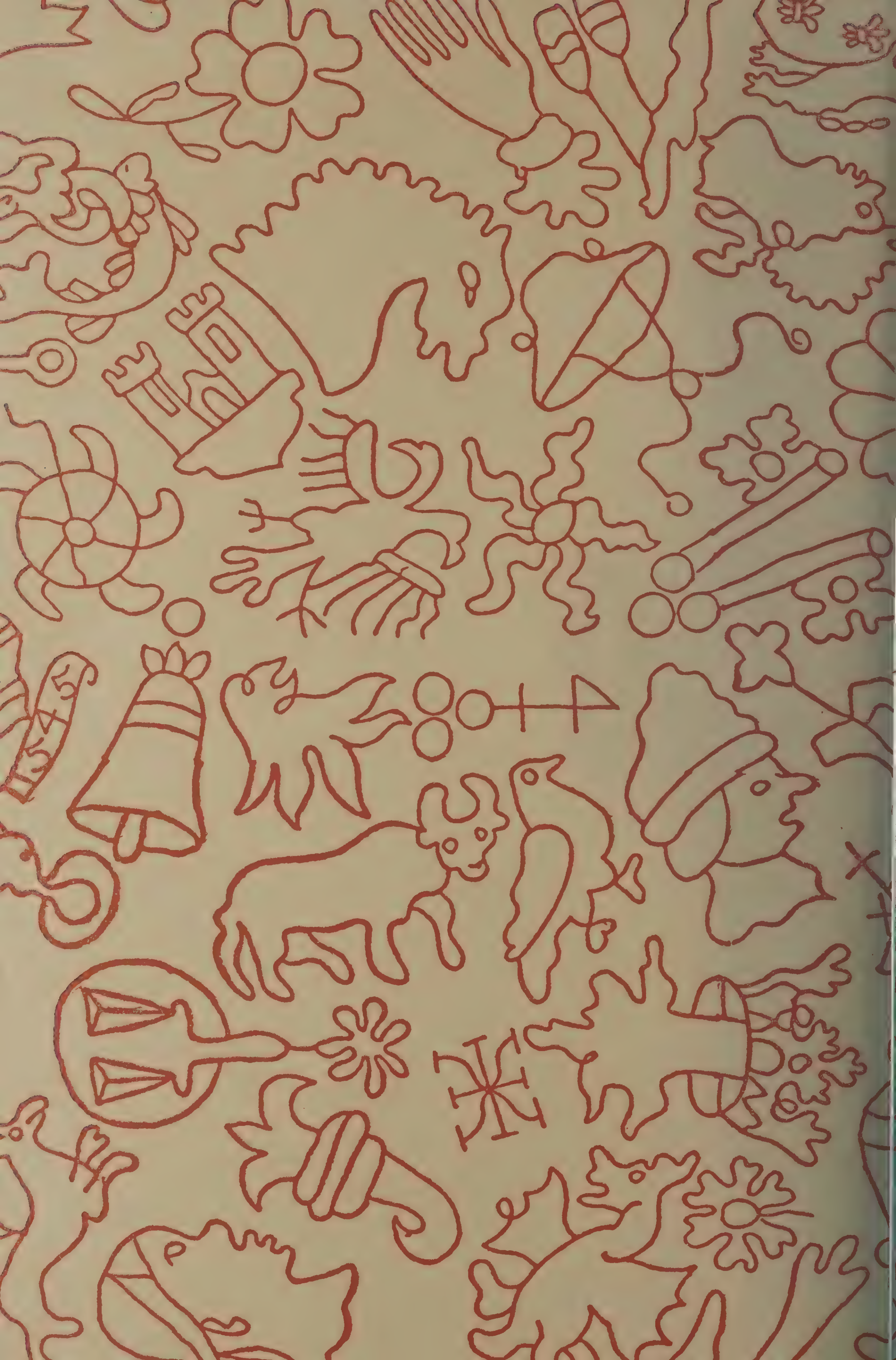
But it would probably be a great pleasure to the pioneer paper mill builder to know that three of his grandsons, one of them his namesake, have carried on in the paper-manufacturing business. They are Stanley S. Taylor, Samuel Penfield Taylor, and James Irving Taylor, sons of James Taylor. They are the owners of the Honolulu Paper Company in Hawaii.

Cerveny

The Illuminated Word

AT high noon of the Dark Ages, there shone forth volumes of wondrous luster, radiant with words exalted into supernal forms, that merged immaculately with calm-cloistered consciousness. These transcendental transcriptions of precious works surpassed each other in grandeur and grace. Skilled scribes lavished lifetimes in sequestered alcoves, on parchment and vellum, dipping their quills into rare colors . . . into their very heart's blood for living hues. Immortal treasures . . . these revered tomes, designed for celestial scrutiny, embellished with soulful arabesques, seemed part of a divine ritual, abiding by ordained symmetries that made effortless alignments with . . . Eternal Truth.

—P. K. THOMAJAN.



THE ADVENTURES OF

NOSEY HILL

: YEARS AGO, at a railroad station in a small
consin town, a rather tattered individual
d off a freight train which had slowed down
y miles an hour. Rather the worse for wear
ır, he proceeded to the station dining room,
he ordered a cup of coffee and two dough-
After looking around, sizing up the four or
ople who were in the place, he caught the
the waitress.

there a paper mill in this town, Miss?" he

e is," she replied, pointing, "it's about a
le up the tracks in that direction."

anks," he said, and tipping the cup to get
drop of coffee, he deposited a dime (which
last, by the way) on the counter and made
out of the dining
He started walk-
the direction she
oted, and after
bout a half mile,
e to a nice-looking
lthough a small

bably a one-ma-
mill," he noted
y, "but, I hope
hey can use a
e tender."

He walked over to what he assumed was the office, in which a light was burning, and rapped on the door. After a moment or two, a rather large individual answered.

"What do you want?" he inquired rather gruffly.

"My name's Nosey Hill, and I thought there might be an opening for a machine tender," said Nosey in a rather plaintive voice.

"Know anything about making lightweight waxings?" the big fellow asked.

"Sure, I worked for mills in Ohio and Michigan, and for some bond mills making manifold."

The old man looked Nosey over very carefully, easing up to him to get a whiff of Nosey's breath which, fortunately, was pure and clean only because of economic reasons.

"I'll tell you what I'll do, Bub," the old man said. I'll give you a trial tonight because my third trick machine tender is starting on a bender and his buddy is in there raising hell because he thinks he has to work sixteen hours. Here's the line-up, Bub. I'm going to tell you about this job here in

Nosey Hill will live forever, of that we feel assured. We thought our series of stories concerning this remarkable character was completed with our last issue, but here another story turns up, sent in by one of our readers. Probably more stories regarding this mastermind of the paper world will come to light as time goes by; if so, we shall publish those which pass the test of censorship, for Nosey was, to say the least, a carefree character. If, in your archives, you have tucked away any record of Nosey's droll doings which have not appeared on these pages, by all means let us have them.

The Editor.

"What do you want?" he inquired rather gruffly.

the office before we go out in the mill, because I want you to know that you are taking over the best little job in the country. We run eighteen-pound opaque waxing on 'er at nine hundred feet. She trims one hundred and twenty inches, runs slick as a whistle, and when we start 'er up on Monday morning, we don't have a break or a wash-up until the following Sunday shutdown. Remember, we expect that kind of performance from you and the machine, and I'll accept nothing else.

"Our slime control is the best, never see a slime hole, Bub, and the clothing is in very good shape. Wire's only a week old, the felts are new and, by the way, the automatic felt guides are the best and they are doing a very good job. So, you see that your job will be to keep an eye on 'er, and run ringers. Don't worry about the dry end crew, as they are the best, having been with me for ten years."

Nosey saw that the office clock showed that it was ten, and the old man was starting for the door leading out in the mill.

"Come on, Bub, and we'll introduce you to your buddy," said the old man.

Nosey followed him through the door out into the mill, and as they entered the machine room he was amazed at the sight which greeted his eyes.

The machine room was very well lighted and the machine was one which would gladden the heart of any man who had ever spent much time in a paper mill. It was painted a dark red, as a pin, and running along as sweet as cou

"Like it?" the old man asked.

"I sure do," answered Nosey. "I have seen such a clean machine room. But tel don't you make any broke?"

"I told you, Bub, that this job don't broke. We ship all rolls off the winder, d edge, and there's darned little broke to speak said the old man gruffly. "But, come on do the wet end and meet your buddy."

Nosey's buddy seemed tickled to deat know that he didn't have to work sixteen h and he was very anxious to show Nosey arou

"Well, I'm going home and get some sl said the old man, "see you later."

After showing Nosey around the machine telling him the same things that the old man said about it, Nosey's buddy said goodnight departed, as it was then about a quarter of el

Nosey stood at the wet end, looking up the and admiring the machine, which was pu like a kitten. He strolled up to the dry end talked to the crew, who impressed him as very capable men, and after a few moments, back down to the wet end and walked aroun screens, noting the speed and stroke of the sh the head, glanced at the breast roll to see i ductor was doing a good job, noted the vort saw they were working, glanced at the jo

"I waded through six inches of small pieces o opaque waxing."

d it was set at 250 amp., and that all the ts showed a nice straight line from seven ck that morning.

Sure a swell outfit," thought Nosey. "I think set down for a little while."

e walked over to a small bench which faced first press on the front side and sat down. ing been without sleep for over twenty-four s and being tired, he closed his eyes for a nap, after glancing up to the dry end and ng that the crew was on the job. It was ten ites after twelve.

hen one is very tired and sleepy as Nosey it is a very easy matter to drift off into a d sleep. This is especially true in a machine , where the jordan will sing you to sleep, as old machine tender will testify.

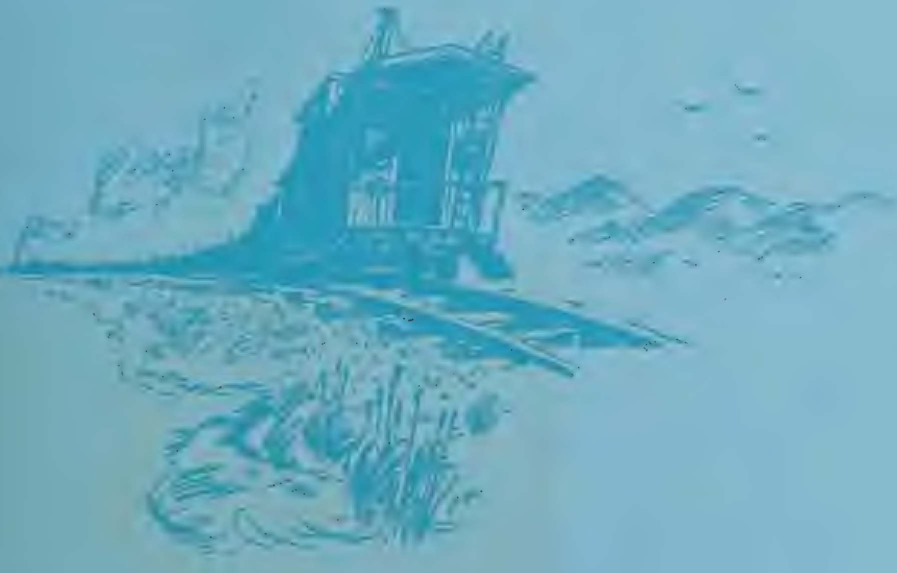
ell, when Nosey opened his eyes again, he ed at the machine and saw that the sheet was into the dryers and that everything was along nicely at the wet end. He also got quite prise when he saw that it was five-thirty and ing to get daylight.

e arose from the bench and walked slowly to ry end, noting as he went that the sheet was going over the dryers in fine shape. When he arrived at the calenders, his heart sank, as the calenders were bare and the reel was flopping around like a wild duck that had been shot in one wing.

The dry end crew was under the winder sound asleep. Nosey was frantic, but let him tell you what happened:

"The first thing I did was get out of the mill as fast as I could. When I hit the outside, I knew what had happened. There were small bits of paper all over the countryside, at least six inches deep," said Nosey.

"Yep, you're right, the dry end crew had seen me taking a nap and thought they might as well have a snooze, too. Well, the sheet had snapped out between the last dryer and the calender, followed the top felt until it was pulled up into the ventilator fan which exhausts on the roof. That must have gone on from twelve-thirty to some time after I left, and I'll tell you I waded through six inches of small pieces of eighteen-pound opaque waxing down to the railroad station, where I hopped a freight which, fortunately, happened to be pulling out when I arrived."



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ARE EXAMPLES
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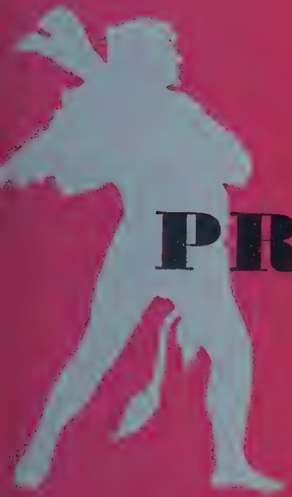
TO THE PAPER INDUSTRY



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*REG. U.S. PAT. OFF.

THE PAPER MAKER

Volume 19 • 1950 • Number One

THE
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REG. U. S. PAT. OFF.

BRONSON B. TUFTS, *Editor*
EDWARD L. GRANT, *Art Edit*

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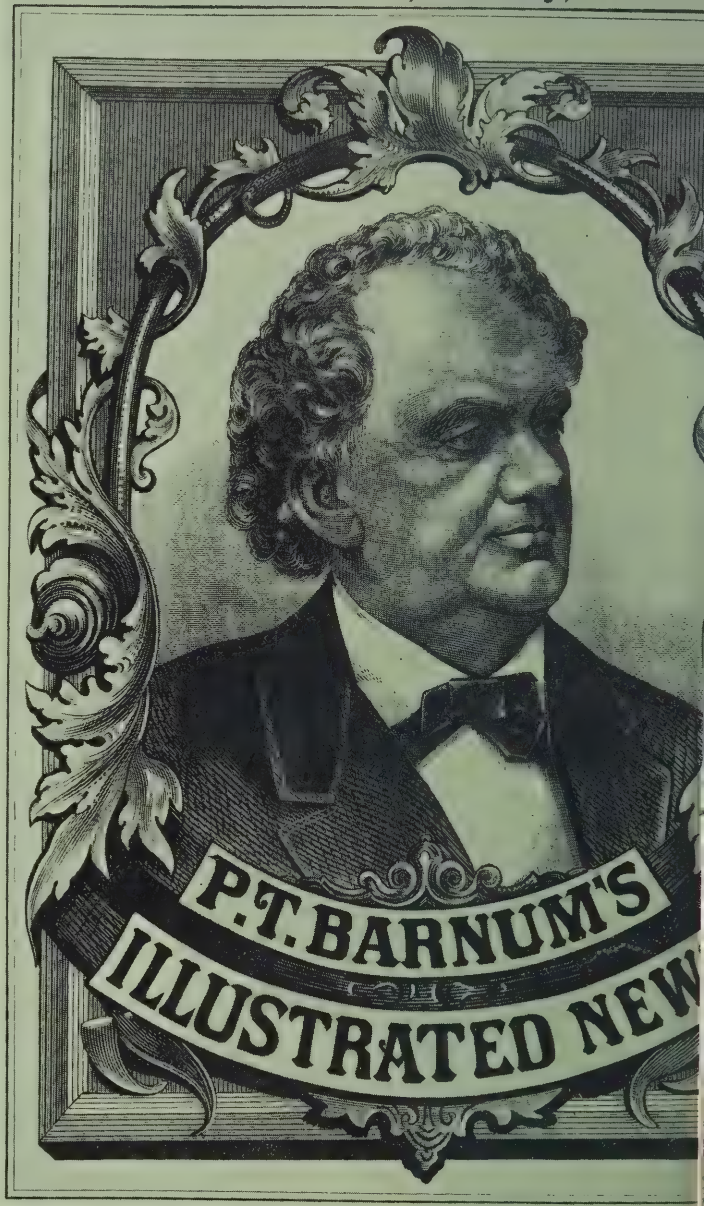


Reproduced here, in about one-fourth of its actual siz
is the cover of Barnum's house organ. We do not kno
the number of pages comprising an issue, but from th
lavish, though astute, manner in which he advertised w
can be certain that the pages were not few, and tha
paper merchants of that day found P. T. Barnum
account a good one.

Fauna from the tropics and the arctic embellished
the side of Barnum's advertising railway coach.
Bettmann Archive

ARNUM BELIEVED IN ADVERTISING

By WILLIAM BOND WHEELWRIGHT

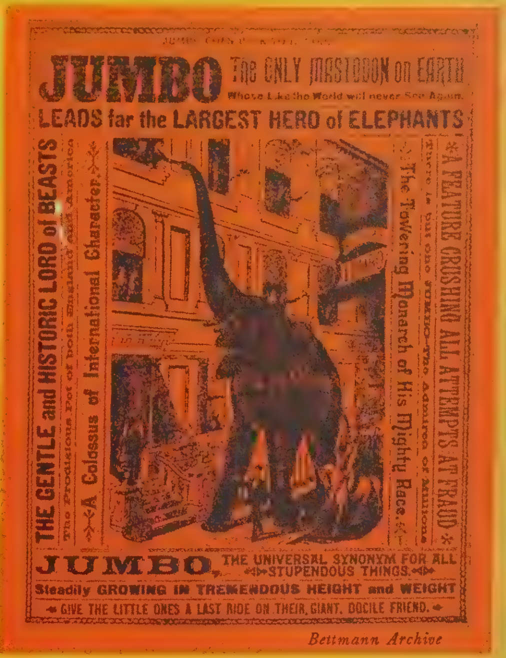
T. BARNUM may be counted among the
best patrons of the paper industry,
se he preached and practiced advertising through-
s amazing and spectacular career. Long before
ising had been hailed as "the youngest of the
sions," he was a past master of the art as applied
show business. He understood the fundamental
les of successful advertising, "not merely by
of printer's ink," which, as he records, "I have
used freely . . . but by turning every possible
stance to my account."

um makes no apology for his deliberate use
yhoo or humbug. He tells all about it in his
P. T. Barnum, Written by Himself, of which
million copies were sold between 1869 and
"I fell in with the world's way," he explains,
f my 'puffing' was more persistent, my posters
laring, my pictures more exaggerated, my flags
atriotic, and my transparencies more brilliant
was not because I had less scruple, but more
, far more ingenuity, and a better foundation
h promises . . . I have yet to hear of a single
e where a visitor went away from the Museum
ining that he had been defrauded of his money."

American Museum was a losing business when
purchased it in the year 1841, when he was
ne years old. "When I became proprietor," he
"there was no bustle or activity about the
no posters to announce what was to be seen; the whole exterior was as dead as the skeletons and stuffed skins within. I printed whole columns in the papers, setting forth the wonders of my establishment. Old fogies opened their eyes in amazement at a man who could expend hundreds of dollars in announcing a show of 'stuffed monkey skins,' but these old fogies paid their quarters, nevertheless, and when they saw the curiosities and novelties . . . like all other visitors, were astonished as well as pleased, and went home and told their friends and neighbors, and thus assisted in advertising my business."[2]

Barnum adorned the exterior of his building with posters, flags, and banners and kept a band of musicians on the front balcony, a band about which he wrote, "whose discordant notes would drive the crowd into the Museum, out of earshot of my outside orchestra." He installed the first calcium lights ever seen in New York, which "lighted up and down Broadway" from his location at the corner of Ann Street.

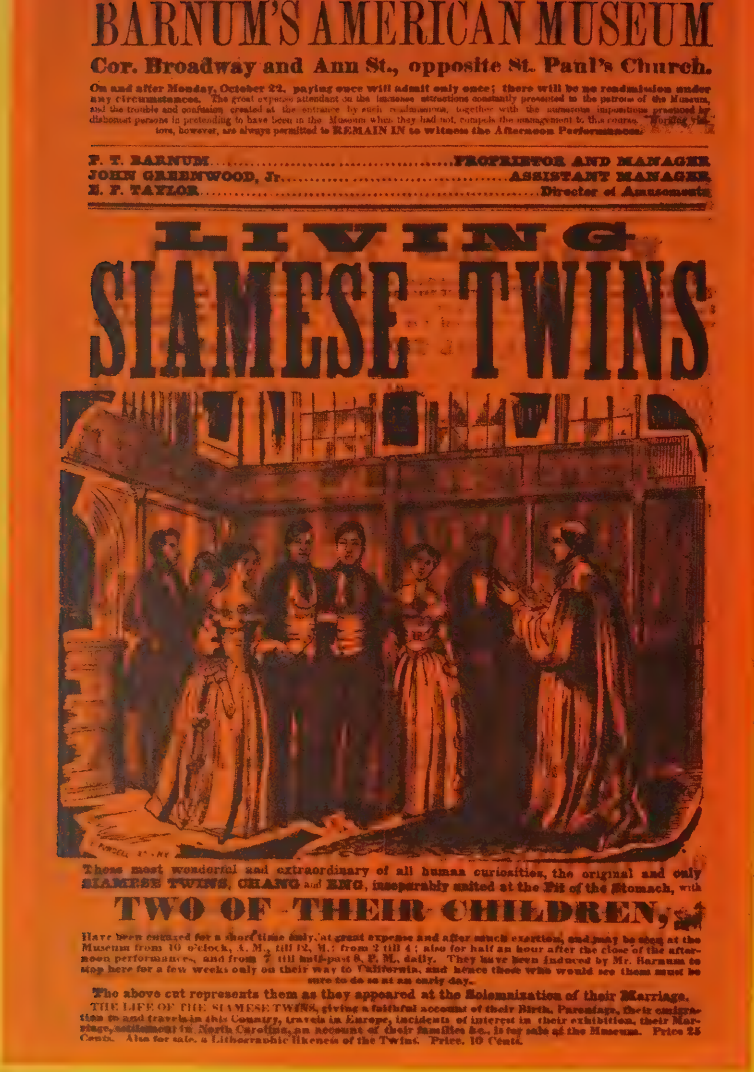
Before the first year ended, he introduced high-grade vaudeville entertainment, and adver-


JUMBO The ONLY MASTODON on EARTH
Whose Like the World will never See Again.
LEADS far the LARGEST HERD of ELEPHANTS
THE GENTLE and HISTORIC LORD of BEASTS
The Prodigious Pet of both England and America
A Colossus of International Character.
The Towering Monarch of His Mighty Race.
There is but one JUMBO—The Admired of Millions
A FEATURE CRUSHING ALL ATTEMPTS AT FRAUD
JUMBO, THE UNIVERSAL SYNONYM FOR ALL STUPENDOUS THINGS.
Steadily GROWING IN TREMENDOUS HEIGHT and WEIGHT
GIVE THE LITTLE ONES A LAST RIDE ON THEIR, GIANT, DOCILE FRIEND.

Bettmann Archive

Jumbo, the far-famed Barnum pachyderm, as depicted on the master's circus poster.

THE LIBRARY OF THE
OCT 23 1950
UNIVERSITY OF ILLINOIS



BARNUM'S AMERICAN MUSEUM

Cor. Broadway and Ann St., opposite St. Paul's Church.

On and after Monday, October 22, paying once will admit only once; there will be no readmission under any circumstances. The great expense attendant on the immense attractions constantly presented to the patrons of the Museum, and the trouble and confusion created at the entrance by such readmissions, together with the numerous impositions practised by dishonest persons in pretending to have been in the Museum when they had not, compels the management to this course. Morning visitors, however, are always permitted to REMAIN IN to witness the Afternoon Performances.

F. T. BARNUM........PROPRIETOR AND MANAGER
JOHN GREENWOOD, Jr.........ASSISTANT MANAGER
E. F. TAYLOR........Director of Amusements

LIVING
SIAMESE TWINS

These most wonderful and extraordinary of all human curiosities, the original and only SIAMESE TWINS, CHANG and ENG, inseparably united at the Pit of the Stomach, with

TWO OF THEIR CHILDREN,

Have been engaged for a short time only, at great expense and after much exertion, and may be seen at the Museum from 10 o'clock, A. M., till 12, M.; from 2 till 4; also for half an hour after the close of the afternoon performances, and from 7 till half-past 8, P. M., daily. They have been induced by Mr. Barnum to stop here for a few weeks only on their way to California, and hence those who would see them must be sure to do so at an early day.

The above cut represents them as they appeared at the Solemnization of their Marriage.

THE LIFE OF THE SIAMESE TWINS, giving a faithful account of their Birth, Parentage, their emigration to and travels in this Country, travels in Europe, incidents of interest in their exhibition, their Marriage, settlement in North Carolina, an account of their families &c., is for sale at the Museum. Price 25 Cents. Also for sale, a Lithographic likeness of the Twins. Price, 10 Cents.

Handbills, too, accounted for paper tonnage. This one, of 1868, shows Chang and Eng, "the original and only Siamese Twins, with two of their children."

tised by large colored posters, illuminated transparencies, and newspaper announcements a special grand opening on July Fourth. He proposed running a string of American flags across the street, attaching one end of the rope to a tree in St. Paul's churchyard. This proposal was indignantly rejected by the astonished and dignified vestrymen.

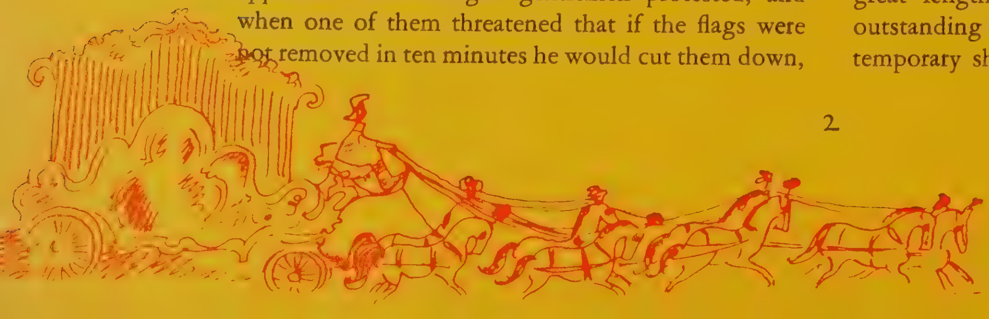
Nevertheless, before daylight on the "glorious Fourth," the flags were up and attracting great attention. About nine o'clock that morning, two angry vestrymen appeared and demanded their removal. Barnum suavely led them from his office into the street, and pointed out how beautiful the flags appeared. The outraged gentlemen protested, and when one of them threatened that if the flags were not removed in ten minutes he would cut them down, Barnum rolled up his sleeves and shouted milling crowd could hear him, "Well, mi should just like to see you dare cut down the An flag on the Fourth of July!"

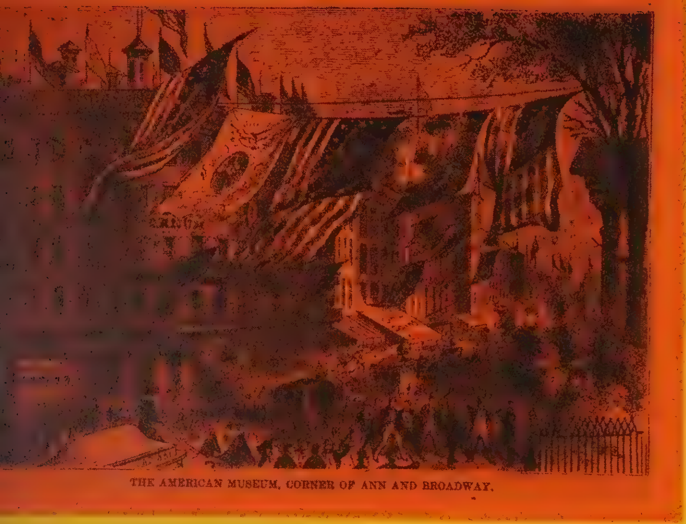
An excited throng closed in and one brawny threatened, "If you want to save a whole b your body, you better slope and never dare again about hauling down the American Flag two vestrymen "sloped," and the flags rema another example of Barnum's odd, but succ methods of advertising.

By one o'clock on that historic day, the m was so jammed that crowds were detained entrance awaiting a chance to go in. As B equivocally expressed it, "This was excee harrowing to my feelings." But he was as cle finding a way to get people out as he had b entice them in. His carpenters were promptly o to improvise an exit from the second floor int Street, which was done within two hours. meantime the scene painter was ordered, take a piece of canvas four feet square, and pa it in large letters: TO THE EGRESS." Thi placed over the new stairway, where the c returning from the third story could not miss it. They would stop, and some would read "To the Egress. Sure, that's an animal we h seen." Many of them would depart this way, m room for more people to enter from Broadwa

Barnum saw no wrong in this deception. H doubtedly felt that those returning from the floor had received their quarter's worth of ent ment (which was undoubtedly true), and that h entitled to improve his own opportunities an disappoint others who wanted to see the mu But it is one of those amusing incidents which lent color to the accusation that he was a "hu and charlatan." But such attacks didn't bother Ba —he regarded them as so much free advertis

A good answer to this libel was recently br out in Ed Sullivan's column, *Little Old New* "I was browsing through an old book store related, "and my eye fell on an ancient v entitled *Barnum*. On the third page, P. T. Ba had written: 'Some smart aleck comedian along way has saddled me with the saying that "the sucker born every minute and two to take hi never could say that. My success has been a vig in detecting what the public preferred.' " He w great lengths and spared no expense to pr outstanding features. He elevated the tone of temporary shows, to which churches and the




THE AMERICAN MUSEUM, CORNER OF ANN AND BROADWAY.

m trees on church premises to his museum building, Barnum
ng a row of flags; then before an excitable, patriotic, pro-
num milling multitude the showman dared the incensed vestrymen
to cut down the Stars and Stripes.

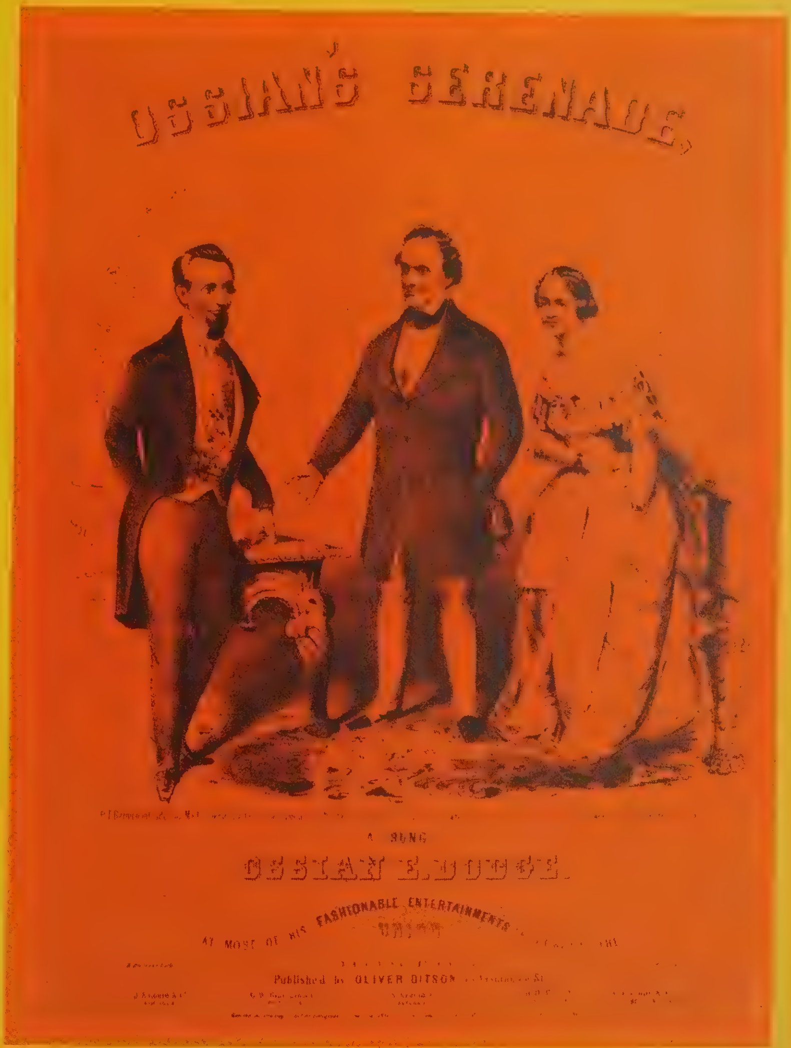
nt of society had strongly objected. From the
ning, vulgarity and obscenity were excluded
his enterprises. Churches actually approved his
tions and scientists praised his zoological
ions, which, of course, was most helpful.

e occasionally featured such an item as "the
with his head where his tail ought to be," and
xhibit consisted of a horse backed into a stall
is head looking out, the people enjoyed the
n themselves and doubtless recommended that
riends see it. Such harmless deceptions were
ore than seasoning to the dishes which were
d, rather than resented, by his public over a
of fifty-six years' showmanship.

num's career had begun in 1835, in his twenty-
ear, when he had been persuaded to buy an
gress, alleged to be 161 years old and a former
of General Washington. She was the headline
of his first brief, but profitable, venture. In a
ntary way it set the pattern for his showman-
At the outset of my career," he wrote in his
ography, "I saw that everything depended
getting people to think, talk, and become
and excited over and about the 'rare spectacle.'"
uilt his reputation on headliners. General Tom
(1842) and Jenny Lind (1850), under his
dinary promotional skill, brought him riches
ernational fame. His museum prospered until
ed by fire in July, 1865. Undaunted by heavy
l loss, he opened Barnum's New American Museum, in November of the same year, only to have it burn down in March, 1868.

In the meantime, he had served with distinction for one term in the Connecticut State Legislature, without prejudice to his show business. But after the demolition of his New Museum, Barnum decided to retire to his beloved home in Bridgeport, "not knowing," as he confesses, "how utterly fruitless it is to attempt to chain down energies peculiar to my nature."

During a trip to California he discovered a dwarf more diminutive than General Tom Thumb, whom he nicknamed "Admiral Dot." The sight of another "rare spectacle" banished all desire for private life. In 1869, he teamed up his new protégé with his old friend, General Tom Thumb, added other attractions, and was off on a world tour. At about the same time, his famous "Siamese Twins" were sent, with other features, on a successful tour through Great Britain.


OSSIAN'S SERENADE
A SONG
OSSIAN E. DODGE
AT MOST OF HIS FASHIONABLE ENTERTAINMENTS
Published by OLIVER DITSON

arnum introduces Ossian Dodge to Jenny Lind,
e Swedish nightingale. This artist's version of
e event illustrated the front cover of a song,
Ossian's Serenade." Ossian, a singer, too, didn't
o badly; he paid $625 for his ticket to hear
Jenny Lind at her first concert in Boston.

THE ARRIVAL OF JENNY LIND IN NEW YORK.

From all accounts, and from contemporary artists' records of the event, the welcome accorded Jenny Lin to these shores was heart-warming to say the least, probably, to the guest, bordering on the awesome.

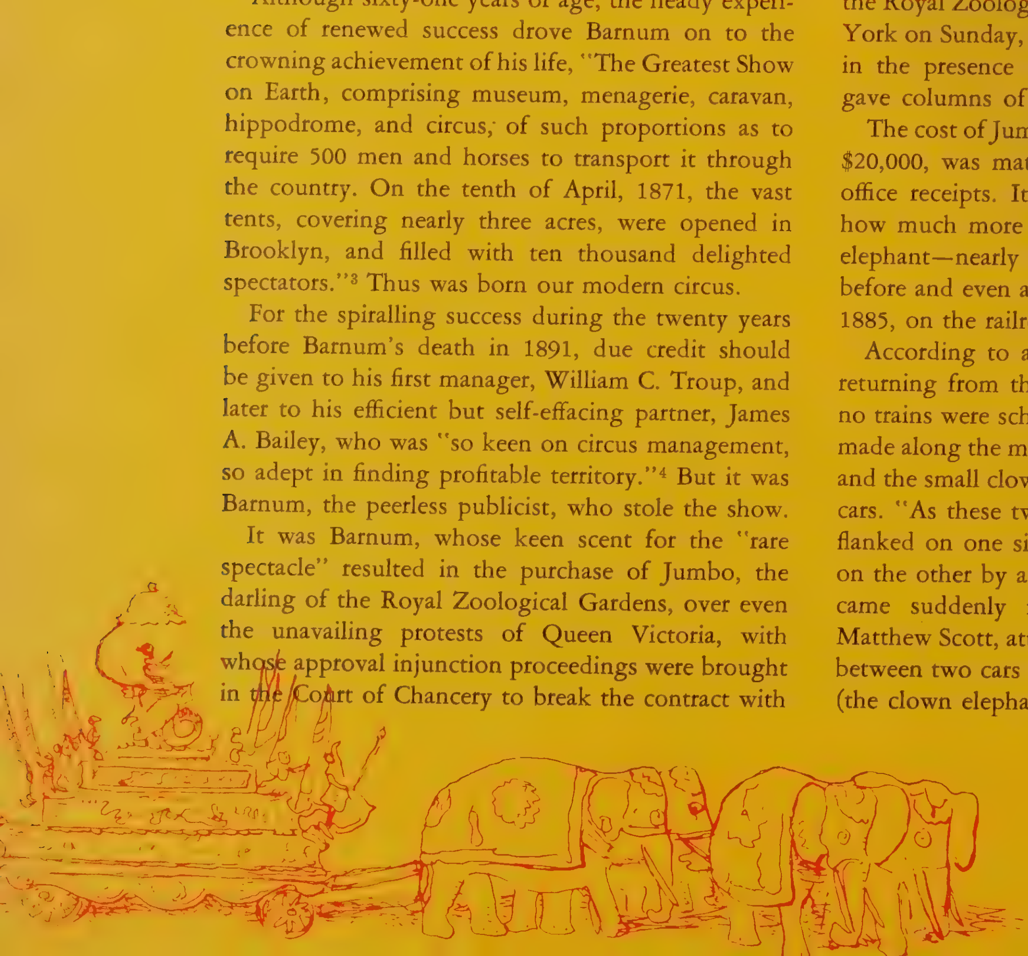
Although sixty-one years of age, the heady experience of renewed success drove Barnum on to the crowning achievement of his life, "The Greatest Show on Earth, comprising museum, menagerie, caravan, hippodrome, and circus, of such proportions as to require 500 men and horses to transport it through the country. On the tenth of April, 1871, the vast tents, covering nearly three acres, were opened in Brooklyn, and filled with ten thousand delighted spectators."[3] Thus was born our modern circus.

For the spiralling success during the twenty years before Barnum's death in 1891, due credit should be given to his first manager, William C. Troup, and later to his efficient but self-effacing partner, James A. Bailey, who was "so keen on circus management, so adept in finding profitable territory."[4] But it was Barnum, the peerless publicist, who stole the show.

It was Barnum, whose keen scent for the "rare spectacle" resulted in the purchase of Jumbo, the darling of the Royal Zoological Gardens, over even the unavailing protests of Queen Victoria, with whose approval injunction proceedings were brought in the Court of Chancery to break the contract with the Royal Zoological Gardens. Jumbo arrived in
York on Sunday, April 9, 1882, to be met by Bar
in the presence of eager newspaper reporters
gave columns of free publicity to the event.

The cost of Jumbo, $10,000, and his transportat
$20,000, was matched within ten days by the
office receipts. It would be impossible to estin
how much more money this "rare spectacle" o
elephant—nearly twelve feet in height—brough
before and even after his tragic death, September
1885, on the railroad tracks at St. Thomas, Onta

According to an eye witness, the elephants
returning from the evening show, and inasmuc
no trains were scheduled at the time, a short cut
made along the main railroad track. All except Ju
and the small clown elephant had safely reached
cars. "As these two were being led along the tr
flanked on one side by a string of freight cars,
on the other by a steep embankment, a freight
came suddenly from the east. Jumbo's kee
Matthew Scott, attempted to drive him to an open
between two cars . . . Accompanied by Tom Thu
(the clown elephant), he had run some thirty ya



the locomotive struck the smaller elephant and ted him down the embankment. Panic-stricken, ran past the only avenue of escape, and in sion stopped and turned about. It was then he locomotive struck him. His head was driven en a box car and a flat car, and such was the force collision that the locomotive and two cars hrown off the rails.

t Jumbo had received a mortal blow. He reached s long trunk and drew close to his great blood- head the only keeper he had ever known, ew Scott, who wept unashamedly in his grief. minutes more and the mammoth heart was r stilled."[5]

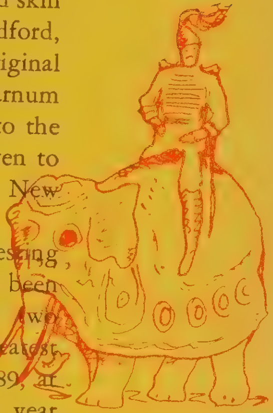
ical of the license Barnum so often took with s a build-up for publicity, his press agents a more dramatic story. "The leviathan of the d the mountain of bone and brawn came er with a crash that made the solid roadbed The heavy iron bars of the engine's pilot were and twisted as if they had been but grape- and its front stripped as if by an explosion of dynamite. With his mighty tusks driven clear back into his brain and his massive skull crushed in, Jumbo . . . gave but one groan after being struck, and then composed himself to meet death with becoming dignity and fortitude."[5]

BARNUM'S NEW AND GREATEST SHOW ON EARTH!
P. T. BARNUM.

Bettmann Archive

num ad of 1876. Understatement was never one num's failings. Who could read his copy, gaze pictured behemoth, and then fail to spend fifty cents for admission?

It was soon announced that Jumbo's mounted skin would be presented to Tufts College, Medford, Massachusetts, of which Barnum was an original trustee, and for which he had built the Barnum Museum. The skeleton was at first promised to the Smithsonian Institution but, finally, it was given to the American Museum of Natural History, New York. The heart went to Cornell University.



Immediately a popular clamor arose, requesting Barnum to exhibit these relics. As might have been expected, Barnum obliged gladly, and for two seasons Jumbo continued his tours with The Greatest Show on Earth, before arriving, in March, 1889, at his present resting place at Tufts. Before the year was up, Jumbo was requisitioned for one last trip with the circus to Great Britain, and was returned in March, 1890. "Glad Jumbo is back," wrote Barnum to Professor Marshall, "and *hope* he will never leave again, but Bailey owns half of him and won't yet decide that point."[5]

This hope has been fulfilled. Jumbo dominates the largest room in the Barnum Museum on College Hill, which also contains Barnum's unique desk and a growing collection of miscellaneous memorabilia, all bearing witness to the genius of Barnum and his undying belief in advertising.

His name, fame, and slogan bloom perennially in New York's Madison Square Garden, a harbinger of spring. After the grand opening, the circus starts on a 10,000-mile tour, under canvas, covering some three score cities, and consuming vast quantities of paper and paper products of many kinds.

As *Life* magazine quite recently observed: "To most Americans there is only one circus, the mammoth Ringling Bros. and Barnum and Bailey organization, which, by ballyhoo, chicanery, a series of prudent mergers and sheer ability to entertain, has survived hurricane, fire, and competition to remain, since its inception under P. T. Barnum in 1871, 'The Greatest Show on Earth.' "

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[1] *The Story of My Life*, p. 99, Cincinnati, Forshee & McMakin, 1886.

[2] Ibid., p. 89.

[3] Ibid., p. 380.

[4] May, Earl Chapman, *The Circus from Rome to Ringling*, New York, Duffield & Green, 1932.

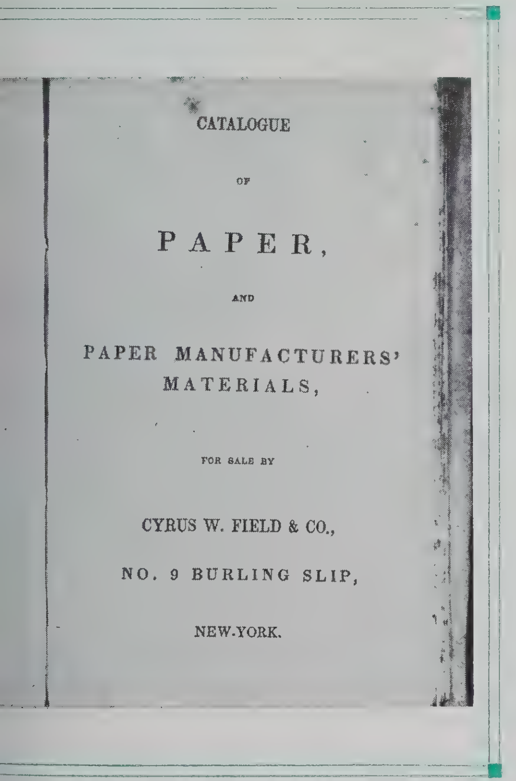
[5] Carpenter, Russell L., *P. T. Barnum's Jumbo* (Reprint from *The Tuftonian*, Tufts College, Medford, Mass.), January, 1941.

Bold Cyrus Field he said, says he,
"I have a pretty notion,
That I can run a telegraph
Across the Atlantic Ocean."
—Old song

CYRUS W. FIELD

A SUCCESSFUL PAPER MERCHANT

By HARRISON ELLIOTT



CATALOGUE

OF

PAPER,

AND

PAPER MANUFACTURERS'
MATERIALS,

FOR SALE BY

CYRUS W. FIELD & CO.,

NO. 9 BURLING SLIP,

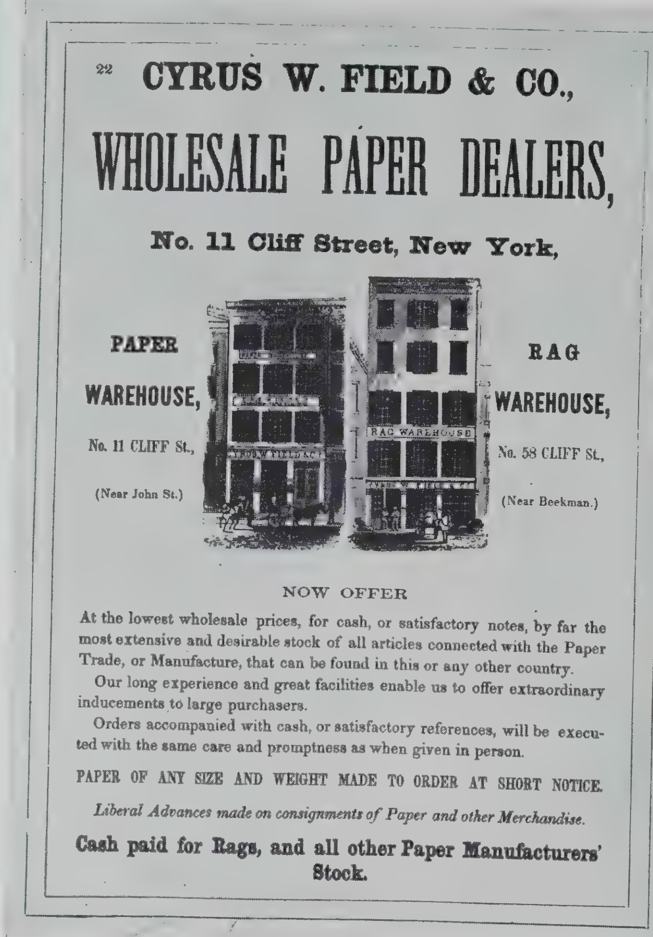
NEW-YORK.

The title page of Field's catalogue, published in the late 1840's. The "and company" was his brother-in-law, Joseph F. Stone.

CYRUS W. FIELD'S fame resulting from his great achievement in laying the Atlantic cable has somewhat obscured the fact that he was a successful paper merchant who built up a profitable business in paper and paper-mill supplies. It was accomplished by initiative, hard work, and a perseverance which characterized all his undertakings.

Cyrus West Field was born November 30, 1819, at Stockbridge, Massachusetts. He attended the local school, but his determination to enter business came to him early in life, depriving him of much in the way of higher learning, and of the benefit of a college education. On April 29, 1835, when but fifteen years of age, he set out for New York City to enter upon his business career. When he left home, his capital consisted of eight dollars which his father had given him.

He obtained employment in the drygoods house of A. T. Stewart and Company (now John Wanamaker), then located on Broadway between Murray and Warren Streets. His first job was as an errand-



22 **CYRUS W. FIELD & CO.,**

WHOLESALE PAPER DEALERS,

No. 11 Cliff Street, New York,

CYRUS W. FIELD & CO.
RAG WAREHOUSE

PAPER WAREHOUSE,
No. 11 CLIFF St.,
(Near John St.)

RAG WAREHOUSE,
No. 58 CLIFF St.,
(Near Beekman.)

NOW OFFER

At the lowest wholesale prices, for cash, or satisfactory notes, by far the most extensive and desirable stock of all articles connected with the Paper Trade, or Manufacture, that can be found in this or any other country.

Our long experience and great facilities enable us to offer extraordinary inducements to large purchasers.

Orders accompanied with cash, or satisfactory references, will be executed with the same care and promptness as when given in person.

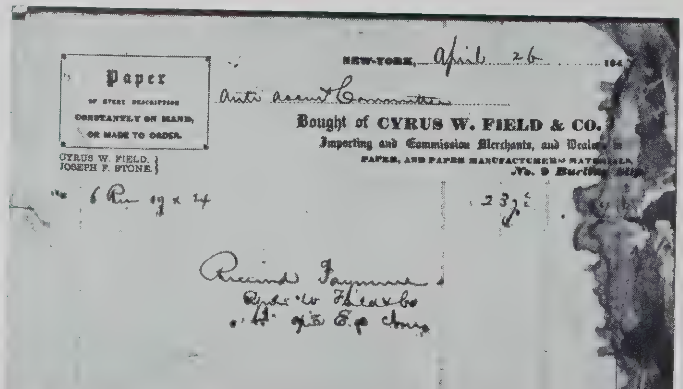
PAPER OF ANY SIZE AND WEIGHT MADE TO ORDER AT SHORT NOTICE.

Liberal Advances made on consignments of Paper and other Merchandise.

Cash paid for Rags, and all other Paper Manufacturers' Stock.

An offer to sell or to buy, with illustrations of the firm's two warehouses.

Below, an invoice for six reams of paper, quality not stated, at $2.37 a ream.



Paper
OF EVERY DESCRIPTION
CONSTANTLY ON HAND,
OR MADE TO ORDER.

CYRUS W. FIELD.
JOSEPH F. STONE.

NEW-YORK, April 26 184

Anti [illegible] Committee

Bought of CYRUS W. FIELD & CO.
Importing and Commission Merchants, and Deal[illegible]
PAPER, AND PAPER MANUFACTURERS' MAT[illegible]
No. 9 Burli[illegible]

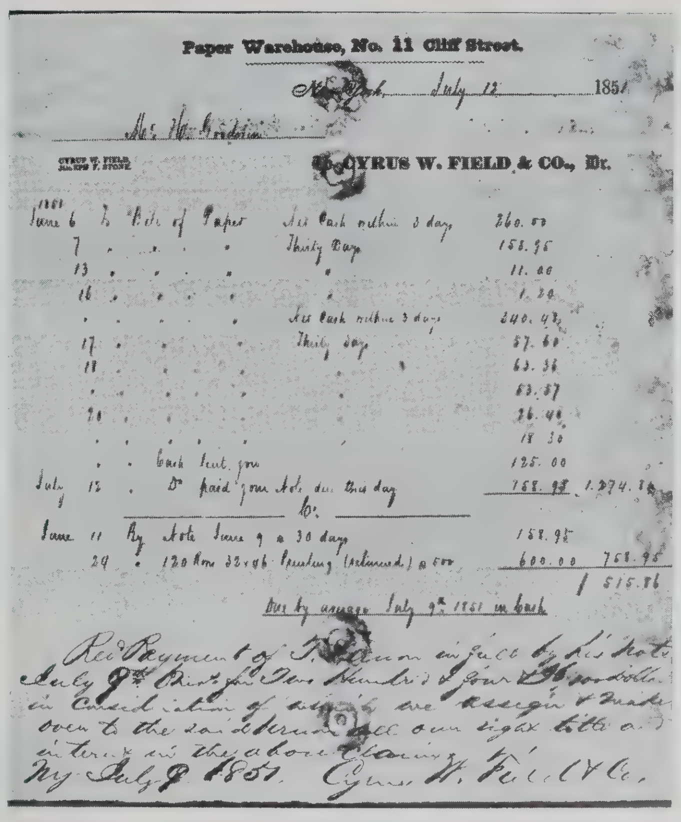
6 Rm 19 x 24 2 37½

Received Payment
[illegible] Field & Co
[illegible]

boy and he later rose to a cler
His first year's salary was $5
second year it was increased to
and the third year it amount
$300. After his three years i
employ of A. T. Stewart and
pany, he returned to Stockb
and began a career in the
industry. He became a bookk
for his brother Matthew D.
who was a partner in a paper
at Lee, Massachusetts. Later
mill became the property o
Smith Paper Company wh
ground wood was first used i
manufacture of newsprint.

While in the employ of his b
er's paper mill, his salary was
a year with board. He becar
successful paper salesman and r
trips to Boston, Philadelphia, W
ington, and New York. His lik
personality won for him r
friends in the trade, which w
stand him in good stead later
the age of twenty-one, he dec
to go into the paper business
manufacturer. He bought an i
est in a small paper mill at W
field, Massachusetts, after whic
accepted an offer from E. Ro
Company, wholesale paper de
in Maiden Lane, New York
Here, Field became a junior pa
and used his acquaintance with
trade in Philadelphia, Baltim
Washington, and Boston in a
tempt to bolster up and rebui
declining business.

However, owing to the effect
the financial depression of 1
the business failed in April, 1
with large liabilities. In some



Paper Warehouse, No. 11 Cliff Street.

New York, July 12 1851

Mr. H. [illegible]

CYRUS W. FIELD
JOSEPH F. STONE

To CYRUS W. FIELD & CO., Dr.

1851 June	6	To Bale of Paper	Net Cash within 3 days	260.00	
	7	"	Thirty Days	158.95	
	13	"	"	11.00	
	16	"	"	1.20	
	"	"	Net Cash within 3 days	240.48	
	17	"	Thirty days	57.60	
	18	"	"	63.36	
	"	"	"	63.87	
	20	"	"	26.40	
	"	"	"	18 30	
	"	" Cash lent you		125.00	
July	12	" Do paid your Note due this day		758.95	1.274.1

Cr.

June	11	By Note June 9 @ 30 days	158.95	
	29	" 120 Rms 32x46 Printing (returned) @ 500	600.00	758.95
				/ 515.86

Due by average July 9th 1851 in cash

Rec'd Payment of T. [illegible] in full by his Note July 9th [illegible] for Two Hundred & four [illegible] dollars in Consideration of which we assign & make over to the said [illegible] all our right title and interest in the above claim

NY July 9 1851. Cyrus W. Field & Co.

Both Field's and Stone's names appear on this detailed statement of nearly one hundred years ago.

table manner, the burden of bts fell upon young Cyrus, he was not the principal of m. He made a settlement e creditors and released himfficiently to wind up the ss so as to start one of his In 1842 he established the ship of Cyrus W. Field & ny. The "and company" s brother-in-law, Joseph F. By 1853, when thirty-three old, Field had built up a ful business and was worth quarter of a million dollars. ough the arrangements with ditors of E. Root & Company en in the nature of a come, he looked up the old debt , computed the unpaid porth interest at seven per cent d each creditor in full. There legal obligation to do this. g to retire from the paper s, Field left $100,000 with ior partner with the underg that he was not to be o devote any time to it. He w a rich man, free to give time to his hobbies essed with a peaceful home life. But he was ung a man to retire, and the most active and part of his life was to follow.

was methodical in his habits and very conus in all his dealings, but somewhat dictatorial management of his business. He has been as saying, "I attended to every detail of the s, and made it a point of answering every n the day it was received."

ar apart as two of his enterprises, the paper s and the Atlantic telegraph, may seem, yet e closely related as means of communication. ck of the telegraph instrument required paper to record the message and to make further transmission of it possible. The cable conveyed the thought, and so that it would not vanish in thin air, paper provided the medium to make the transmitted thought a matter of record for all time.

What is related here is only one phase of a useful life which ran the gamut of everything from being called a deluded fool to acclamation as the most outstanding figure since Columbus. Adverse criticism was not without some effect upon his honest nature. After a life of public service and generous deeds, Field died in 1892, a somewhat saddened and disillusioned man, but an outstanding example of a fine type of upright and courageous American citizen.

The photographs on this and the opposite page are from the Bella Landauer collectio
in the New York Historical Society.

THE STORY OF THE SOUTH COAST PAPER MILL

A FORTUNE FROM STRAW

By FLORENCE DONNELLY

"I LOVED TO GO to the mill, the straw smelled so sweet, and there were so many men, and everyone so busy," said smiling, gray-haired Mrs. Louisa O'Neill, whose husband was the son of the founder of the pioneer South Coast Paper Mill at Soquel in Santa Cruz County, California.

All I knew when I started to get material for this article was that a Mr. O'Neill and a Mr. Callaghan had a paper mill at Soquel in the early days. So I went to that little community. For a time, I was completely baffled. I knew the O'Neills had owned a ranch there but the attendant at the gas station had never heard of it. I inquired from several more people, with the same result. A woman who had overheard my question pointed across the highway to an unpaved road and said, "The O'Neill ranch is up there on the old San Jose road, but it is rented to the Mellos."

Slowly I drove along the road she had indicated, trying to see where a mill might have been located along the creek bed which was to the right of it. It was perhaps a mile before I stopped. There were no signs of a mill, but to the left was a charming old farmhouse with an inviting tree-shaded driveway. I turned the car and took the drive which went around to the back of the house. I called out to a boy standing there, "Is this the O'Neill ranch?" He stared at me and then shook his head, "No speak

Edward O'Neill, founder of the South Coast Paper Mill; his wife, Mary, nee Kilduff; and their son, John J., born in Stockbridge, Mass. Below is John J. O'Neill grown to manhood and, when this picture was made, a student at the University of Santa Clara in California.

English." But my call attracted a bright-faced youngster, who assured me my guess was right. Then I wanted to know about a mill. He was gleeful, "Sure there was a mill here, I'll show you the picture." I jumped out of the car and followed him to a small shed. He pulled away at a pile of rubbish and down tumbled a colored picture pasted on a thin slab of redwood, a favorite way of mounting pictures a half century or more ago. It was a paper mill all right but underneath was the name "Lebanon."

I walked slowly to the house. The young woman who came to the door said she knew nothing about a mill but that Mrs. O'Neill, the owner of the ranch, lived in Santa Cruz, just a short distance away.

The first time I saw
O'Neill, her son, Dr.
R. O'Neill of San F
cisco, and his wife
with her. Then and in
sequent visits during w
I read the legal docum
concerning the Soquel
and heard Mrs. O'N
first-hand account o
operation, I learned
story of how a fort
was made from straw.

YOUTHFUL VENTURE

Two adventurous brothers, Edward and F
O'Neill, left their native Boston to travel by scho
to the Isthmus of Panama, and after crossing it
boarded ship again to sail to San Francisco. This
in the 1870's and California was the land of op
tunity for the young and fearless. For Edw

gh excited at the prospect of a successful e, it was not a joyful journey. He had left his wife, the former Mary Kilduff of Lee, Massa- ts, and their small son, John, behind. He l he must provide a home in California before ould join him.

O'Neill brothers found work as soon as they in California. Edward, who had worked in mills in the East, got a job at the Lick mill. long he decided to go along the south coast the country around Santa Cruz and the fruit- leys near it, of which he had heard so much. s familiar with the early history of California, intrigued him.

last pueblo founded under Spanish domination lla de Branciforte, located on the opposite side river from the Mission of Santa Cruz, estab- by the Franciscan Fathers in 1791.

e were only three Spanish pueblos—Los s, Santa Cruz, and Branciforte—in what is now olden State. The last named was designed as defense and a place to colonize discharged s. Official recommendation was that at Branci- an adobe house be built for each settler so e prevalent state of things in San Jose, and geles, where the settlers still live in tule huts, nable to build better buildings without neg- their fields, may be prevented." Each house be built at a cost of not more than $200.

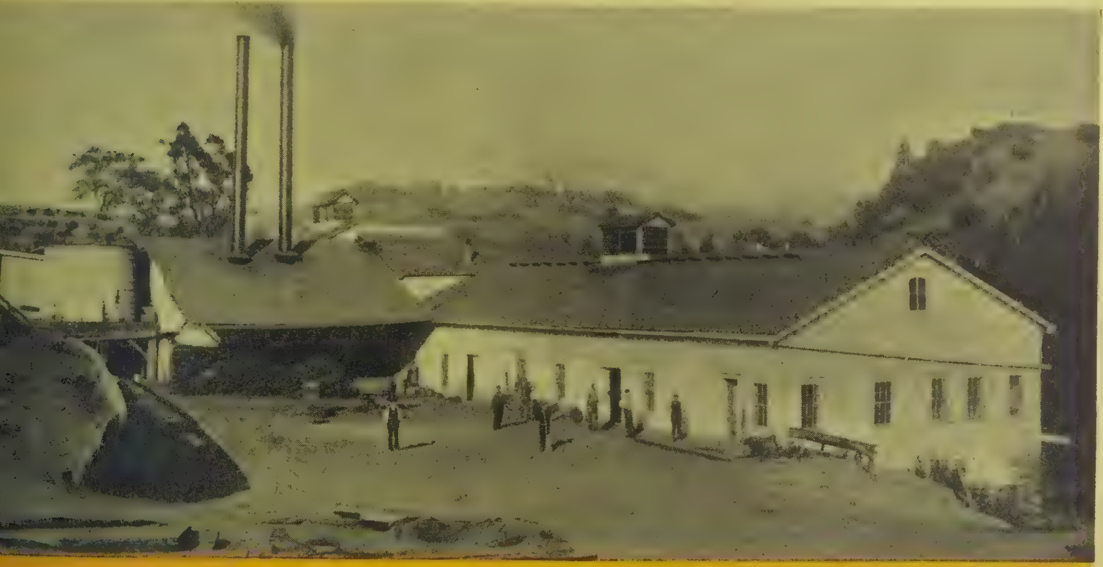
total population of the three pueblos in 1800 was about 550. Agriculture and stock raising were the only industries of the inhabitants of Branciforte.

Mrs. Edward O'Neill and a niece, Miss Kate O'Neill, on the porch of the O'Neill home at Soquel. The paper mill was just across the road.

THE SOQUEL GRANT

In 1822 Mexico achieved its independence from Spain and acquired California. Martina Castro obtained a grant of the Soquel rancho from Governor Figueroa on November 23, 1833, for 1,668 acres. She also obtained a grant for the Soquel Auymentation rancho of 3,272 acres. The second tract had vast forests of redwoods, live oak, madrone, and other wood on the mountainsides. Parcel by parcel the land was sold. Much timber was felled to be shipped away, as transportation was comparatively simple for those early days. The logs were taken by ox team to nearby Soquel Landing (now Capitola) or to Santa Cruz and were then loaded on schooners which plied between the Pacific Coast ports. The land cultivated in the Watsonville valley and around Soquel was mostly for wheat raising. Today this section is one of the finest fruit belts in the whole State.

The Bear Flag, symbol of California's independence from Mexico, was unfurled in 1846, only to give way almost immediately to the Stars and Stripes. It was



A view of the front of the South Coast Paper Mill with some of the mill personae. An ideal spot for **a mill, nestled in a hollow of the California hills.**

not until the winter of 1847-48, however, that there was the first planting of fruit trees by Americans. That winter, on the west side of Soquel Creek, John Daubenbiss, a pioneer of 1842, and John Hames, who had arrived in California a year later, each planted a small orchard of apple trees sent to them from Oregon.

A few years afterward, the two pioneers became partners in a flour mill which they built on the bank of the creek, or river, as it was called. The timber for the building was hand-hewn and the lumber put together with dowels. The mill was converted sometime later for another type of industry. On June 26, 1873, the articles of incorporation of the Soquel Wool and Leather Company were approved by the State. These articles provided for "the manufacture of pulled, scoured and cleansed wool and every description of Morocco and sheep leather and such kinds of leather dressing as may be conveniently connected therewith." The leather and wool were right at hand as huge herds of cattle and sheep were pastured on the Soquel ranches.

The office of the South Coast Paper Mill, across the road from the mill site.

MILL SECUR

When Edward O arrived in the villag realized the great pos ties of the country an tered into negotiatio secure the mill. He lea on May 20, 1879, Edward Porter who a to rebuild the flume ca the water from the cre the water wheel and to vide sufficient water t the machinery—vital and most necessary deta

From daylight to dark young O'Neill work reconvert the mill, this time for the manufactu paper. He was familiar with the process of ma straw into paper and there was golden promis him in the ripening grain fields. His brother I joined him, and Edward's wife and son arrived the East after a long and tiresome journey.

Anxiously they awaited the results of their cooking of straw. The strong, clean odor of lin the huge pot was in their nostrils. The thunder o steam engine made the building quiver. The coo over, the pulp was ground and washed and ther over hot cylinders, first on canvas and then on

Members of one of the two shifts that turned straw into paper, standing before the trim and tidy mill buildings.

e first paper was dark and crude, but the O'Neills led unceasingly to perfect their product. Before g they were turning out a splendid thick, heavy per, known as butcher paper.

Retailers were clamoring for the O'Neill paper l soon large shipments were made on the steamer psy from Soquel Landing to San Francisco and Angeles.

By May, 1884, the O'Neills had made enough ney to buy the mill and make extensive improve- nts on it. A few years later Edward and Frank Neill bought the ranch, which today belongs to former's widow, and which I saw for the first e when I drove up the old San Jose road. The h house, which had been built by Hames, was the other side of the road from the mill but a short distance away. The lumber was put ether with dowels and the timber for the barn was d-hewn.

SOUTH COAST PAPER MILL

he deed to the mill states that for the consideration 9,000, Benjamin F. Porter and Edward Porter nt, bargain, sell, convey and confirm unto Frank eill, Edward O'Neill, John H. O'Neill and Alex- r Lewthwaite" the property.

e opening clause of the description reads: ginning at an oak tree on the west bank of the el Creek above the bridge." The South Coast r Mill also acquired the rights of the Soquel Wool Leather Company to the "waters of the Soquel r" and to the "flume, ditch, tunnel or aqueduct erly known as the Hames and Daubenbiss Flour- Mill Flume and the Soquel Wool and Leather pany's flume, tunnel, ditch, or an aqueduct ever ed and possessed by Hames and Daubenbiss or oquel Wool and Leather Co."

e articles of incorporation of the South Coast r Mill, dated September 20, 1887, state the ose of the corporation "shall be to manufacture, sell and deal in pasteboard and binders and s of all kinds and description." The five direc- were Edward O'Neill and his two brothers, and John, each with 3,000 shares, valued at share and Lewthwaite and John Mathews, both om had only a few shares. The last two remained e company only a short time, and in 1888 O'Neill, who was ill, deeded his shares to his ers. Thus the two brothers, Edward and Frank, now in full control of the young, and rapidly ng, enterprise.

A VILLAGE LASS

A pretty, hazel-eyed, brown-haired girl, Louisa Getzchman, whose birthplace was Soquel and whose parents had an inn there, was a frequent visitor at the mill. These were combined business and pleasure jaunts for the lass, as she took the lunches to the mill workers. Louisa, who was to become the daughter-in-law of the mill founder, tells of the men working day and night shifts, the clouds of steam, the huge vat with the boiling straw, and of the baled straw which lay in great piles under shedlike coverings in a large field, enclosed by a picket fence. Enormous stacks of wood provided the fuel for the steam engines. The office building, which was across the road from the mill, was a one-story structure ornamented with the "gingerbread" so popular in that period.

Fire was always a menace. Louisa twice saw a small fortune go up in smoke. The people of the village worked valiantly with the mill hands to save the buildings when flames swept over the stacks of straw.

Baled straw to the amount of thousands of dollars was piled in th the mill storage yard.

"The Soquel mill was a money-maker," Mrs. O'Neill told me. Her mother-in-law had often related the story that just before one of the fires, she and her husband discussed at great length how they would invest $10,000 they had in cash. They decided to buy more straw. Hardly had the $10,000 worth of potential paper been unloaded in the straw yard when fire wiped out their savings.

BRIDAL COUPLES

Although Louisa had been to the mill many times, she did not meet John O'Neill, who was the only son of the Edward O'Neills, until he was attending the University of Santa Clara. Those were not the days of casual friendships. Undoubtedly the two young people had seen each other at the mill or in the village many times, but they did not exchange greetings until after Jack had asked Louisa's brother to make the conventional introduction.

"He asked me to go riding," Mrs. O'Neill smiled, as she recalled the handsome dark-haired suitor, "and I did." Several years of courtship followed, since the young man did not claim his bride until after he was graduated from the university.

But Louisa and Jack, who were married on January 2, 1895, were not the first honeymooners at the Soquel estate who listened to the music of the "old mill stream."

Charles W. Callaghan was given a half interest in the South Coast Paper Mill as a wedding present. Charlie, as he was known to his friends throughout California, was the son of Daniel and Jane Callaghan, and was born in San Francisco January 1, 1866. The senior Callaghan had arrived in San Francisco on April 15, 1852, having traveled, too, by the hard and tedious Isthmus of Panama route. Charlie spent much of his boyhood in Shasta, a boom town in northern California during the gold-rush days, where his father had a large general store which catered to the mining and cattle men. Subsequently the pioneer was interested in the manufacturing business in San Francisco, and then, with James Phelan and Peter Donahue, established the First National Bank of San Francisco.

The mill surrounded by homes, farmlands, and California hills. Fuel for the mills, felled in the mountains not far away, is piled in the foreground wood yard.

Charlie and his nine brothers and sisters received their higher education in San Francisco. He attended Sacred Heart College, which formerly stood where the Emporium is now established, and was graduated from St. Ignatius College, in San Francisco, in 18

The young man fell in love with Rosanna Fran Wheeler, the daughter of another pioneer. Her fat had also arrived in California in 1852 and settled Bath, Placer County, where he owned and operat the Paragon Mine and the Breese-Wheeler Mine.

At St. John's Church in San Francisco on Septem 17, 1889, Charles Callaghan and Rosanna Whee were married. Greatly pleased were their famili because the marriage cemented the bond between t Callaghans and the Wheelers, the parents having be close friends since their arrival in California.

NEW PARTNERSHIP

As the bridegroom had always shown an inter interest in the manufacture of paper, his father pu chased a half interest in the South Coast Paper M as a wedding gift to the young couple. The inter in paper manufacture was natural enough, for t Callaghans were "papermaking stock" and Charli father had been a hand-papermaker in Ireland.

The partnership of Edward and Frank O'Neill a Charles W. Callaghan was a happy association whi continued over the years. It was a prosperous busine for all three. The mill equipment was improved. N products were created, sheathing paper among the The Callaghans made their home in the village Soquel but they were frequent visitors at the O'N ranch.

Then came the lure of the north and Edward O'N pioneered again at Lebanon in Oregon. He was t first paper-mill owner to locate there—in 1889. Char Callaghan remained at the Soquel mill, although was interested in the northern project, too. T Oregon plant, known as the O'Neill and Callagh mill, was in operation in 1890. Mrs. Edward O'N remained at the Soquel ranch because her moth who resided with her, was ill. Soon after Louisa a Jack O'Neill were married, he went to Lebanon assist his father. His wife remained at Soquel to aw the birth of her first child, Edward. When he was c enough to make the long and difficult journey, s took him to Lebanon. The O'Neills remained there f about ten years. The Lebanon mill interests were la acquired by the Crown Zellerbach Corporation.

The first two Callaghan children, Dan and Ro Marie, were born in San Francisco; William, Charl and Jane have Oakland, California, as their birt place. However, the Callaghan and O'Neill childr spent their early childhood in Lebanon.

Death ended the long partnership of Edwa eill, pioneer paper-mill owner; and Charles W. ghan. The founder of the Soquel mill died on h 18, 1904, at the home ranch at the age of 58. nd his wife, Mary, who lived until March 4, 1941, de by side in the Santa Cruz cemetery. Frank eill, who never married, resided in Oakland in iter years and died there March 6, 1924.

k O'Neill, his wife, and two sons on their return Oregon lived on the el ranch, and to the -hewn timbered house made many improve- s. The ranch property eveloped and provided d income.

LAST DAYS

t for the South Coast Mill it was the end. l pulp had supple- ed straw as the raw ial in papermaking. Soquel mill was aban- l. The buildings were down, the machinery sent south, and the rty on which the pio- mill stood was sold. several houses are on te. John O'Neill died ctober 15, 1942, and his eldest son, Edward, mbed to illness three years ago.

The late Charles W. Callaghan, pioneer paper manufacturer and co-owner of the South Coast Paper Mill. Two sons were admirals of our Navy.

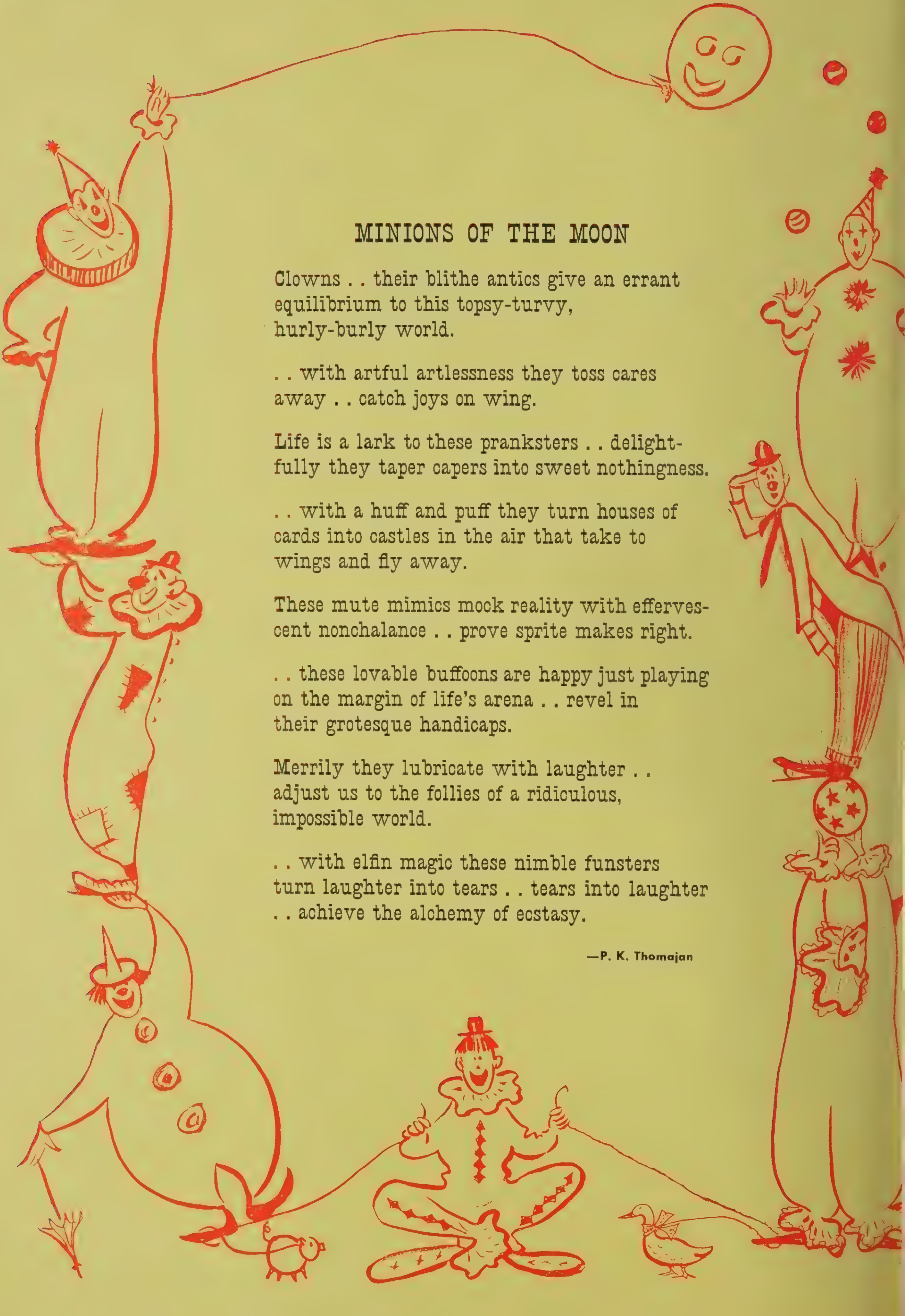
rlie Callaghan continued active in the paper try. He was a stockholder in the Alaska Pulp aper Company, in Juneau, Alaska, and was a er of the Union Paper Company in San Fran- and continued active in the paper pulp busi- ntil his retirement about twenty years ago.

rles Callaghan never entirely recovered from ock of the death of his hero son, Rear Admiral l J. Callaghan, who was killed on the bridge of gship—symbolically enough—the U.S.S. San sco. Admiral Callaghan, who was graduated he U. S. Naval Academy at Annapolis in 1911, a night battle in the Battle of the Solomons in the South Pacific in 1942. This was one of the first decisive naval engagements of World War II.

The famous papermaker was the father of two admirals. The other, Rear Admiral William Callaghan, who commanded the U.S.S. Missouri during a major battle off Leyte and Okinawa, is in command of the newly formed Military Sea Transportation Service in Washington, D. C. His brother Charles (Chad) is a chemical engineer and owns and operates the California Vegetable Oil Company in Berkeley. A sister, Rose Marie, who died of pneumonia in 1932, left a husband and two small children. The other sister, Jane, is the wife of Captain Phillip Costello, U. S. A., and resides in Oakland. It was in April of 1949 that the newspapers printed the obituary of Charles W. Callaghan, and in July that of his wife. They are entombed in the family vault at the Santa Clara Catholic Cemetery, not many miles from Soquel where they had begun their married life.

Mrs. Costello and Mrs. O'Neill were both most cooperative in providing me with material for this article and I know of no more beautiful conclusion for it than to quote phrases from the letter that Jane Callaghan Costello sent me: "It would please Dad very much to have an article written on the subject (the South Coast Paper Mill) as the paper business and all its ramifications were very close to his heart. His association with the O'Neill brothers was a long and honorable one and extended beyond the sale of their business interests . . . I welcome this opportunity to have tribute paid to dear and devoted parents, whose daily example of Christian love and duty was a constant inspiration to their children. Thank you so much for your interest in developing this story of Dad and the mill—it means a great deal to the boys and me."

No trace remains of the operating records of the Soquel mill so no definite figures concerning production or employment can be given now. Further, those who were actively engaged in the mill's operation are no longer living, thus making it impossible to quote from memory. That the tonnage produced was large for the period in which the mill operated there is no doubt; that figures cannot be given is to be regretted. The Editor.



MINIONS OF THE MOON

Clowns . . their blithe antics give an errant
equilibrium to this topsy-turvy,
hurly-burly world.

. . with artful artlessness they toss cares
away . . catch joys on wing.

Life is a lark to these pranksters . . delightfully
they taper capers into sweet nothingness.

. . with a huff and puff they turn houses of
cards into castles in the air that take to
wings and fly away.

These mute mimics mock reality with effervescent
nonchalance . . prove sprite makes right.

. . these lovable buffoons are happy just playing
on the margin of life's arena . . revel in
their grotesque handicaps.

Merrily they lubricate with laughter . .
adjust us to the follies of a ridiculous,
impossible world.

. . with elfin magic these nimble funsters
turn laughter into tears . . tears into laughter
. . achieve the alchemy of ecstasy.

—P. K. Thomajan

RICHARD A. McDONALD

TO RICHARD A. McDONALD—for his business career of thirty years in the pulp, paper, and pa converting industries of the Pacific Coast, a career that began in 1920—at which time he es lished a wax paper plant in Oregon, and a few years later added two more wax paper plants in fornia, an organization which he served as president until its merger with the Pacific Coast's la pulp and paper-manufacturing company; for his modus operandi, actively pursued, that ste step has brought further success and increased responsibility—his present official business conne being executive vice president and director of the firm that acquired the previously mentioned pl a firm having sixty-eight manufacturing, converting, merchandising, logging, and forestry divis throughout the United States, mostly on the West Coast—with mill locations in Oregon, Washing and New York (these mills having a combined daily capacity of nearly 2,500 tons of various k of paper)—vice president (1931–1938), director since 1933, executive vice president since 1 director since 1945 of a paperboard manufacturing and converting enterprise which operates paperboard mills (two in Washington, and three in California); for his participation in the affai the American Paper and Pulp Association, he being a member of its Executive Committee and c Board of Governors; for his early experience in construction work on various projects throug the United States (1910–1920) that gave economic background upon which to build solidly; fo club affiliations—business and social, a half dozen of them, that reveal his desire to be a hel citizen in his community—all of which characterize a man outstanding for his leadership, inte and driving power in an essential industry.

HAROLD LIONEL ZELLERBACH

O HAROLD LIONEL ZELLERBACH—for his heritage in the paper industry, his grandfather having founded a paper-merchandising establishment in 1868 in San Francisco (the city which since has ained the location of the executive headquarters of the far-flung operations of the present parent porate organization), his father—with foresight and dynamic drive—having broadened the scope of vities by entering the papermaking industry, and, over a period of fifty-two years, expanding protion and converting facilities to include mill and plant operations on both the Pacific Coast and in East, thus creating a paper empire which today produces a wide range of paper specialties (fruit p, toilet tissue, paper toweling, and other items) as well as paperboard—daily production capacity nills totaling 2,420 tons of paper and paperboard; for his formal schooling in two institutions of her education—one on the Pacific Coast, the other in the Keystone State—which, together with his ctical experience and native business acumen, has given him the background so necessary to his ed responsibilities as executive vice president of the parent corporate organization and as either sident or director of each one of several subsidiaries; for his feeling of responsibility to the industry to the nation, he having been president of the National Paper Trade Association of the United es and having served during World War II as a member of the Industry Advisory Committee for Office of Price Administration; and, especially for his interest in family, art, and religion—he being narily a family man and finding perhaps his greatest joy in his three grandchildren, he having been sident of the San Francisco Art Commission and continuing to concern himself deeply with the ural activities of the city, and he being active in the religious activities of his faith—family, art, and gion—keys, each one of them, to a richer and fuller life.

For fifteen years Harry E. Weston has prepared the biographical material which has appeared on our Honors Pages. Though busy at all times with many duties concerned with the paper industry, Harry, as he is affectionately known to his multitude of friends in the paper world, has unfailingly completed his assignments and delivered his copy in ample time for each issue. Those familiar with the details of obtaining and recording accurately material of this kind will appreciate the magnitude of his task.

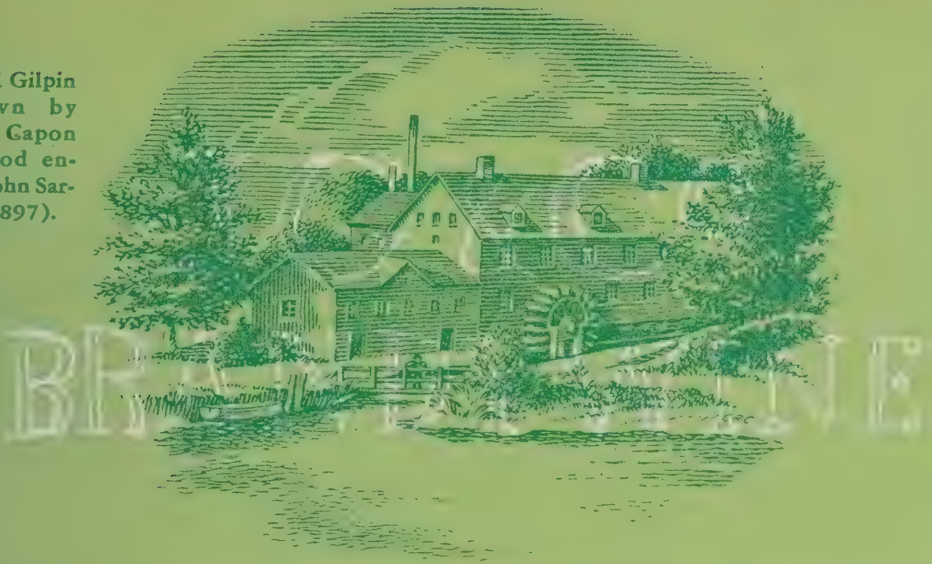
Beyond this, his original style of writing has won wide favor for these biographical sketches and the many other contributions he has made to these pages.

So, on the page opposite, we present a special Honors Page, to honor Harry E. Weston and to record pertinent facts of a life devoted to the paper industry, and by which the paper industry has profited.

HARRY E. WESTON

ONORS . . . TO HARRY E. WESTON for his lifelong devotion to the paper industry—a devotion which goes
far beyond the normally considered bounds of "duty" to one's job; for his habit, early acquired, of sharing
nowledge of pulp and paper manufacturing with others (he began teaching a course on pulp and paper-
machinery while still an undergraduate at the New York State College of Forestry in Syracuse, and wrote
wn textbook); for courageously taking on the new role of advertising manager for *The Paper Industry* because
lt his knowledge of paper could help serve the industry in that way; for subsequently editing that magazine
its successor, *The Paper Industry and Paper World*, in such a way that it rose to new heights of responsibility
authority in its field; for accepting a new post in the industry in 1948—that of associate secretary-treasurer
he American Pulp and Paper Mill Superintendents Association, Inc.—in order to work more closely with
and paper manufacturers for the advancement of the whole pulp and paper industry (evidenced by a me-
al erected recently in Philadelphia in honor of William Rittenhouse, builder of the first paper mill in this
try, it being only one of several projects already completed; numerous projects on a wide range of subjects
articular interest to operating executives in process; still other projects in contemplation; and the editing
e many papers and proceedings covering annual conventions of the Association for the Association's year-
); for continuing to write about paper and to give lectures which re-emphasize the importance of paper to
ivilization; for assembling a unique collection of books on the art of papermaking; for helping to organize,
43, the Chicago Professional Paper Group (now the Chicago branch of TAPPI) and serving as its president
wo years (1944–46); for stressing through a lifetime the scope and dignity of his profession and the satisfac-
inherent in a job well done (he received the 1949 George Arents Pioneer Medal—for an alumnus of Syracuse
ersity—for being a "born teacher . . . an original thinker, an advocate of technical training, and an
nent of improved human relations").

e original Gilpin
ll drawn by
arles R. Capon
m a wood en-
ving by John Sar-
(1808-1897).



THE GILPIN PAPER MILL

ON THE BRANDYWINE

By HARRISON ELLIOTT

N A WOODED and picturesque tract of land at a bend in the Brandywine River, two miles above nington, Delaware, the Gilpins, Joshua and mas, in 1783 erected a paper mill. This mill was ecome of historic importance in 1817. In it was t and successfully operated the first papermaking hine in this country for making paper in a con- ous web; not only that, but in greater width than been previously possible by the hand-mold od. The hand process necessarily limited the ut as to speed, size, and quantity.

omas Gilpin seems to have been a man of much ude and initiative. Although not the originator e papermaking machine, he displayed much in- ity in setting up his own. The first r machine was the invention of Nico- ouis Robert in France in 1798. How- it did not emerge from France fully loped, but was perfected through the oined efforts of the Fourdrinier broth- England in the year 1807.

e action of the Fourdrinier type of ine is such that the pulp flows on ndless traveling woven wire screen, nating some of the water, and the web is then led between pressing and through drying cylinders and ders. This was not the type after Gilpin modeled his machine. The Gilpin machine was of the cylinder type. The pulp in the cylinder machine takes its sheet form from a revolving screened cylinder, partly submerged in a vat of pulp. The cylinder picks up the pulp and deposits it in sheet form on couch rolls, and the web is then transported through press rolls, drying cylinders, and calenders, similar to the treatment it receives on a Fourdrinier machine. The idea of the cylinder machine was first conceived and made practical by John Dickinson in England in 1809.

From its beginning in 1783 until December, 1817, all paper produced in the Gilpin mill was made by hand; that is, each sheet was made separately in a mold manipulated by hand, and was restricted as to size by the dimensions of the hand-mold used. The process was slow and leisurely and limited the supply of paper, particularly for printing purposes.

It is not a matter of record how Gilpin obtained the idea for his paper machine. But it was so successfully operated, and produced such a practically flawless sheet of paper right from the start, that the theory must have been carefully thought out and planned. An early account of the Gilpin machine claimed that it delivered a sheet of greater width than any made in this country, and of any length desired. It was also stated that the

THOMAS GILPIN.
1776—1853

machine did the work of ten crews working by the hand-made method and produced three reams an hour. The machine turned out a web thirty inches wide at the rate of sixty feet a minute, "as smooth as satin." It was attended by two men and a boy at a saving of $6,000 to $12,000 a year in wages.

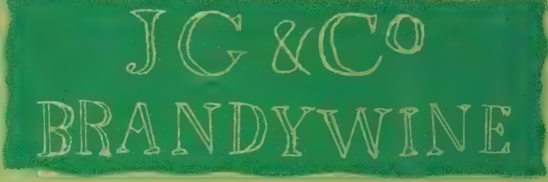
Prior to the introduction of machinery, the Gilpin mill had a certain degree of eminence. A letter to Benjamin Franklin written by Joshua Gilpin and dated April 30, 1788, had this to say:

> "I beg leave to present his Excellence Benjamin Franklin, Esq., with samples of such kinds of paper as have been made at the Brandywine Mill."

Franklin as a printer was very much interested in establishing the paper industry in this country, and was instrumental in the starting of eighteen paper mills, which is undoubtedly an all-time record.

De Warville, the French statesman, in relating his travels in the United States in 1788, made this favorable comment in connection with the Gilpin mill:

> "This town (Wilmington) is famous for its fine mills: the most considerable of which is a paper mill belonging to Mr. Gilpin and Myers Fisher, that worthy orator and man of science whom I have often mentioned. Their process in making paper, especially in grinding rags, is more simple than ours. I have seen specimens of their paper, both for writing and printing, equal to the finest made in France."



A reproduction of an early Gilpin watermark as it appeared in paper on which was written a document dated October 18, 1790.

The Gilpin mill produced both laid and wove types of paper. A specimen of an early wove paper made in the Gilpin mill, and bearing its watermark, is a sheet of writing paper which I have with a letter dated 1806 written on it. At that time wove paper was comparatively new in this country. It first came into use here in 1795 when Isaiah Thomas printed the *Elegiac Sonnets and Other Poems* by Charlotte Smith, on paper of that type. The paper was the product of Isaiah Thomas' own mill and was advertised by Thomas as a "new business."

Gilpin's papermaking machine began production in August and about the end of the year was supplying paper for *The American Daily Advertiser* of Philadelphia, and other newspapers. Book and writing papers of good quality were also produced. Evidence of the lasting quality of the Gilpin book pape indicated today by a copy which I have of Lavoisne's *A Complete Genealogical, Historical, Ch ological and Geographic Atlas.* The whole title pag too exhaustive to give here. My copy bears publisher's imprint of M. Carey & Son, Septem 1, 1820, and the legend: "Printed by T. H. Paln on the Ruthven Press, and on J. & T. Gilp Machine Paper. (Price thirty dollars, half bounc The volume is large folio and the condition of binding shows that the book has had much us but the text paper (Gilpin's machine-made) is substantial texture and has retained much of original brilliance of color.

In February, 1822, during an unprecedented flo the Brandywine overflowed its banks with m violence and the Gilpin mill structures which w thought to be out of reach of flood waters were spite of all precautions, carried away by the flo that rose to a height of more than twenty feet. flood raged for two days and when it finally subsid there remained a mass ruins. The machinery a complete wreck w much of the import parts missing—utter r to what had cost years labor and thousands dollars. Then about months later one of principal mill buildi containing much valuable machinery unfortuna was totally destroyed by fire of undetermined ori

Regardless of all these calamities, operations w resumed until a further freshet in the spring of 1 caused such havoc that it ended a half century industry by the Gilpins. The Gilpin estate was s and the mill given over to the manufacture of cot goods. The Brandywine to the Gilpins was not " bright, the laughing Brandywine" that the p Thomas Buchanan Read, termed it, nor was it " placid Brandywine" of Sydney Lanier.

The Gilpin mill buildings and equipment and mill site were objects of much interest to visit who were many and frequent and well entertain The Gilpin management was commendable, and neatness and orderliness within and without the n buildings were such as not to detract from the natu beauty of the surroundings. The dwellings of mill operatives were well kept, and the whole est lishment gave the impression of comfortable pr perity and praiseworthy industry.

The advertisement on
opposite page is appearing
current trade publicatio

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BRONSON B. TUFTS, *Editor*
EDWARD L. GRANT, *Art Editor*

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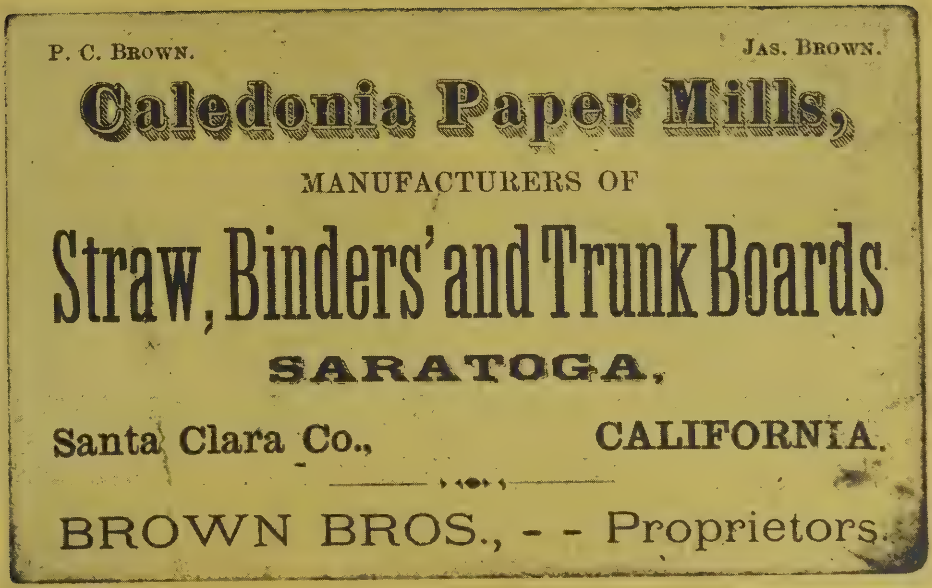


P. C. Brown. Jas. Brown.

Caledonia Paper Mills,

MANUFACTURERS OF

Straw, Binders' and Trunk Boards

SARATOGA,

Santa Clara Co., CALIFORNIA.

BROWN BROS., - - Proprietors.

The business card of Peter and James Brown when they operated their Saratoga mill before moving to Corralitos.

First in the West

The Story of Peter and James Brown and How They Successfully Overcame Obstacles to Produce Strawboard on the Pacific Coast.

By Florence Donnelly

A small mill, built in 1870 on the bank of the picturesque stream in the village of Saratoga, Santa Clara County, was the beginning of a great and important industry on the Pacific Coast—that of paperboard manufacture.

It was a daring adventure which Peter Somerville and his son embarked on in that year of 1870. They had the imagination to foresee the possibilities of their product, but it was two young Scotch brothers and a Chinese, who was skilled in the craft of paper-making which his countrymen had learned hundreds of years before it was known to the Western world, who made the dream come true.

The Somervilles had worked at the King-Meyer Company straw-paper mill, located on Campbell Creek in Saratoga just a short distance above where they constructed their own mill for the manufacture of paperboard. Legal records show that Peter Somerville purchased land for his mill on February 20, 1870, and that same day entered into an agreement with Mary Springer to build a flume on her land. The *Scientific Press* in its June 4 issue of that year acclaims the Somerville mill "for the manufacture of 'pasteboard'—the first mill of the kind on this [the West] coast."

The publication went on to say: "The capacity of

THE MILL FORCE AT CORRALITOS

Many of this group are not identified, but in front, holding the paperboard, is Peter C. Brown, one of the two founders and proprietors. Standing at the extreme left is James O'Mara. Seated at the extreme right is Ah Que whose papermaking knowledge was of invaluable aid.

the mill will be one ton of board a day. Water power will be employed to run the machinery, with a 16-inch Jonville turbine wheel, under a pressure of 36-foot fall. A boiler will supply steam for the bleaching works similar to the paper-mill works. The pulp machine will prepare the bleached straw. No drying cylinders are employed but a large yard is to be used in which to dry the board. I had always supposed that some sort of paste was used to stick layers of paper together in making pasteboard, but Mr. Somerville explained that away. The right quantity of pulp is forced through the rollers, to make the board the right thickness at one operation. Mr. Somerville and his son, both intelligent mechanics, claim to be papermakers of the fourth and fifth generations. Mr. Somerville told me that, when a boy, he used to make paper by hand. . . . The board will be used for making boxes, etc., on this coast and Mr. Somerville expects the demand to more than equal his supply.

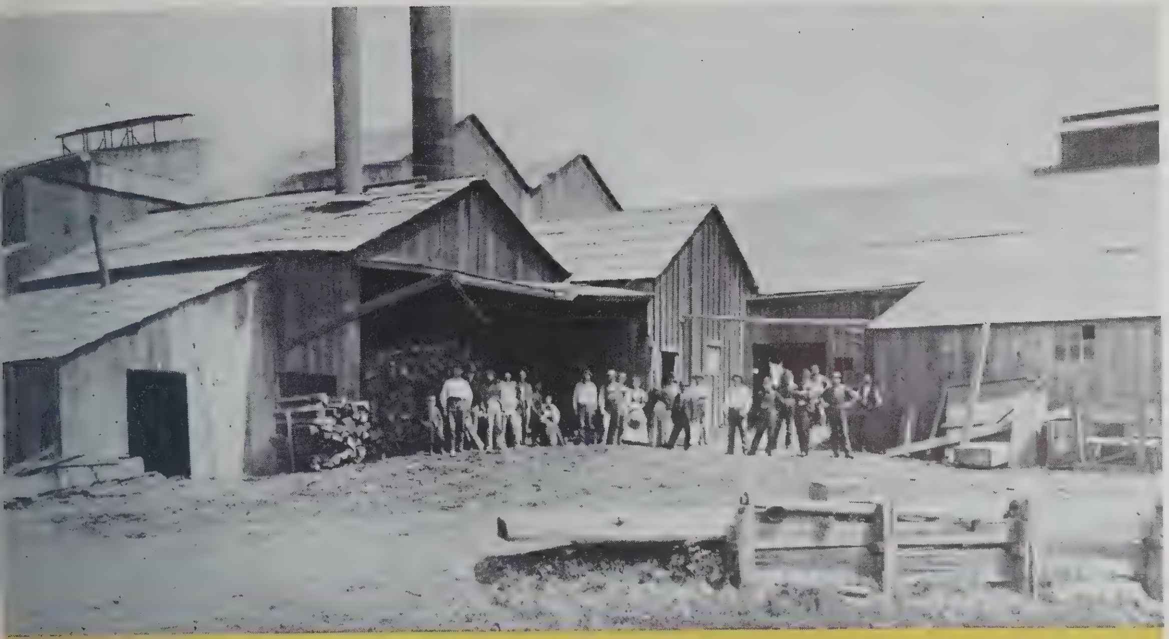
"No Chinese labor is used or desired in either of the paper mills here. This intention was emphatically expressed. He will prefer rye straw to wheat straw, and will give double the price in preference."

But the high hopes of the Somervilles were t
blasted and they were followed by a numbe
other owners and operators.

YOUTHFUL VENTURE

Then onto the scene came Peter C. Brown and
brother James. Their birthplace was Scotla
Peter was born March 4, 1850. His brother was
years younger. Their father, who was a millwrig
died in his native Scotland when Peter was ei
years old. Five boys and two girls were left fath
less. When Peter was twenty-one, he came to
United States. He and his brother James and
sister, later Mrs. John Grant, were the only im
diate members of the family to come to this coun

Peter, an expert cabinetmaker, who had lear
his trade in his native land, located in Clevela
Ohio. He attended the Presbyterian Church re
larly and it was there he met Catherine Steen Bo
who was to become his wife. She was born
Blackborn, Scotland, May 1, 1851. Her father
a master miller and during her early girlhood he
operated a flour mill on the small river known
Afton Water. When she was eighteen, she ca



THE CORRALITOS MILL AND THE MILL PERSONNEL

Peter C. Brown stands at about the center of the group, wearing his coat. James O'Mara stands on the end, at the right. The piled wood is fuel for the mill boilers.

ith her parents and brothers and sisters to America, ttling in Cleveland.

California, because of its many opportunities, as calling young people west, and the year 1878 und the Brown brothers in Oakland in the uilding-trades business, Peter doing the carpentry d cabinet work, James the painting. One of their llow workmen was Robert Oram, a papermaker ho had learned the trade in Scotland and who had orked in the same paper mill where the father of e Brown brothers had been a millwright. Oram new of the mill at Saratoga and he talked of its eat possibilities. Soon he had Peter Brown so thusiastic he went to Saratoga and secured an ption to purchase from a San Jose attorney, a r. Brown, who was custodian of the mill propty. In two days' time Peter was back in Oakland, d James quickly decided he would join him in is new and entirely different venture.

CALEDONIA PAPER MILL

Neither Peter nor James Brown knew any of the chnical details of the processing of paper or paper-ard but they were both ambitious and fortunate. They had the assistance of Oram and Ah Que, a Chinese who had worked at the Saratoga mill.

The Browns took possession of the Saratoga paperboard mill in January, 1879. It was not difficult for them to decide on the name for their new possession. They gave it the name of their native land, Caledonia.

Peter Brown in later years often recalled the obstacles which had to be overcome at Saratoga. His eldest son, Bruce, summarized much of what he had been told in an article for *The Pabco World*, in the issue of February, 1925. He wrote: "The mill consisted of a wet machine with a cylinder 36 inches wide, a small beater, an open bleach tub, a boiler and engine, and a pair of calender rolls. It was capable of producing up to 6,000 pounds of air-dried board in 24 hours.

"In those days the market was limited to binder's board, trunk board and air-dried strawboard for set-up boxes, mostly the latter. (Paper cartons, folding boxes, paper cans, shipping cases, wallboard, car lining, sheathing, and the large varied line that now makes up the tonnage of the mills had not been developed.)"

Bright as were the hopes of the Brown brothers, they faced prospects which were pretty grim. It was a poor time of year to start the mill—in the winter—with no wood for fuel and no straw for the bleach tub and no funds in the treasury.

But the word *defeat* was not known by Peter or James Brown. They persuaded the farmers to give up enough straw to meet the mill's requirements until the next harvest. A wood dealer let them have fuel until the roads to the lumber mills in the mountains could be opened after the rains.

INTERIOR VIEW OF THE CORRALITOS MILL

To this location the Brown brothers moved their mill equipment from Saratoga in 1880. They erected a new mill building on foundations originally constructed for a flour mill.

Then the machine was started and the fan pump immediately went to pieces!

Peter Brown's skill as a cabinetmaker stood him in good stead. He made a new fan pump out of hardwood which was in use long after the firm was in a financial position to buy a new iron one.

The brothers had to overcome another obstacle, too—the poor reputation the product of the Saratoga mill had before the Browns came i
possession. San Francisco was the market, and p
of warped and uneven board were standing in m
warehouses there. The owners of the Caledo
mill assured the customers that they would turn
a good product, and it was with the understand
that only first-class board would be charged
that orders were secured.

The first order was given by Alexander Lewtha
for S. P. Taylor, whose paper mill in Marin Cou
was the first west of the Mississippi and wh
warehouse was on Clay Street in San Franci
That first purchase was for two tons of boar
$80.00 a ton. Some of the other early custon
were Buswell, Wempe Bros., Weisman the Boxm
er, Hicks-Judd Co., and Blake Moffitt and Town

The paperboard at the Caledonia was dried in
open air, and Peter Boyce, one of Saratoga's ol
residents, remembers romping over the board
boy. However, the drying yard was not for l

village playground after the Brown brothers k charge. The product was carefully inspected et by sheet, and because the quality was good mill prospered.

A wheelbarrow was used to convey the board to from the drying yard, until the new firm had cient finances to purchase a horse and cart. The paperboard was hauled in wagons over nine es of road to San Jose and sent by freight train m there to San Francisco. As the market in- ased for the Caledonia product so did the staff workers at the mill. Between ten and twelve n were employed on a daily basis.

TO CORRALITOS

After about two years of operation at Saratoga, was decided that a new site had to be secured. e ranchers along Campbell Creek were complain- of the pollution of its waters by the Caledonia l King-Meyer mills. Also, larger quarters were ded. The *Santa Clara County History*, published at t time, said: "When they [the Brown brothers] k possession [of the paperboard mill] the ality of the manufacture had much deteriorated, t by earnest labor, and careful workmanship, so od a business has been built up that the premises too small, and a removal to more ample quarters Santa Cruz Co. is contemplated."

Peter Brown drove through Santa Cruz, the acent county, looking for a location where there uld be an ample supply of water, straw, wood fuel, and where transportation would not pose problem. He found just what he wanted at rralitos, near Watsonville.

In 1853 Benjamin Hames, a millwright, came to lifornia from South America and went to Soquel Santa Cruz County, where his brother, John, ed. The newcomer began looking about for perty to buy. He found it, and early in 1854 rchased 2,300 acres of land in a pleasant little lley in the foothills and called the place rralitos, meaning little corral. He built a flour ll on the west bank of Corralitos Creek. Its ge mill stones ground the flour, and the machinery s run by water power. A dam was built in reka Canyon, in which was the northwest branch Corralitos Creek, and water was conveyed to the ll by a large flume, then sent down a steep incline over a water wheel, then down into a millpond and back into the creek.

Hames leased the mill for several years to O. P. Wilson of Soquel. Then Robert Orton became the owner and in 1866 he employed Franklin Aldridge as a miller. In the early 70's Aldridge, Charles Ford, and Lucius Sanborn became the owners of the flour mill. It was from Aldridge's grandson, Albert A. Bradley of Corralitos, that I learned the exact location of the flour mill and its early history.

Sanborn, Ford, and Aldridge sold the mill site to the Browns and moved the flour mill, except for the foundations and water-power plant, to Watsonville where they built a large, and for those days modern, three-story mill building.

The Brown brothers moved their paperboard mill equipment from Saratoga to Corralitos in 1880, and constructed the new building on the foundations of what had been those of the flour mill. It was an ideal location for their purpose: a mountain stream; at the foot of a canyon where sawmills were cutting timber, thus providing wood for fuel; and at the head of the huge wheat-growing Watsonville valley, so that an ample supply of straw was assured.

ADDITIONAL MACHINERY

The firm of Brown Brothers took another Scotsman, William Watson, in as a partner and the company then became known as Brown Bros. and Watson. Soon after this move a paper mill at Point Arena was purchased, and Peter Brown and William Watson dismantled it and started to move the machinery to the Point Arena wharf. It looked for awhile as though it was going to be an impossible feat. The road down to the ocean was over the mountains. The boiler was lost down the mountainside; and it was several days before it was hauled back and placed on the wagon. But, finally, machinery was piled onto the Point Arena wharf. A small steamer, the "Duncan," was engaged to transport the equipment. On arrival at Aptos, the partners had to pay $600.00 for the ocean transportation. From Aptos, the machinery was moved by wagon over the hills to Corralitos, where it was set up. The mill then contained the small wet-board machine and a small 48-inch straw-paper machine with two cylinders and seven dryers.

As the paperboard company used steam power, the old millrace was obsolete and the water rights were sold to the Watsonville Water Company.

William Watson was with the company only a short time and after he left, it was known as the Corralitos Paper and Board Mill.

The Browns had brought the employes, among them the indispensable Ah Que, and their families from Saratoga. A number of the townspeople at Corralitos were added to the crew. The improved facilities at the new mill meant more business. Prosperity had come to the pioneer firm!

MARRIAGE TIES

For years Peter Brown had been courting Catherine Boyd by letter. Now he was in a position financially to establish a home for her. He sent for his beloved Katie. Alone she came from Cleveland to San Francisco and they were married at the home of a Scotch friend, John McLaren, who became world famous as the creator of the bay city's magnificent Golden Gate Park. And Peter and Katie Brown went to Corralitos to establish their home in the trim little house across the road from the mill.

The working hours at the mill were long but the hours of the young husband, striving to provide for his wife and the family which was to come, were much longer. All of the children, five sons, were born in Corralitos. The eldest was Bruce. The others were Murray, Everett, Harvey M., and Ralph. The names are in chronological order. There was a difference of two years in the ages of each son.

James Brown, who had married Belle Burell, a San Jose girl, also lived near the mill. Their sons and daughter were born at Corralitos, too.

The mill, as well as the Brown family, grew rapidly. Machinery from the King mill at Saratoga and from the Lick mill was purchased and moved to Corralitos. A machine was also bought from the Stockton mill, and these machines were made into two 48-inch straw-paper machines.

Wrapping paper made from straw was losing its place on the market, because Manila paper was being produced from wood pulp. The demand for strawboard, however, had increased, and in 1892 one of the paper machines at Corralitos was made into a three-cylinder steam strawboard machine. At first it did not operate successfully, but in 1894 Fred Gerdau came from the East and put machine in good running order. It had a capac of seven tons daily, which, with the three tons the wet machine, made the paperboard output the West Coast ten tons a day.

Albert Bradley, in recalling the days of the at Corralitos, said: "I don't know exactly h many employes they had, about thirty to fo people I should say. I never heard of any la trouble. The Brown brothers were good to th employes and built cottages for all those that ca with them. The local help employed had their o homes. There was only one serious accident wh the mill was in operation. A man fell into the la vat of steamed straw and lost his life."

HUMAN PAPER WEIGHTS

The second generation of Browns grew up in paperboard business. Bruce Brown said: " learned to be weather prophets and knew when squirrels took in their dried fruit from the to the redwood stumps that we, too, should gathe the board or have it damaged by rain."

The small fry, who could not be of much ass ance otherwise, were sometimes "paper weigh holding down piles of rough dried board on wagon, as the product was hauled to mar

In the early days the mill operated on a shif fifteen hours, from 6 a.m. to 9 p.m. When it w on two shifts of twelve hours each, Harvey or of his brothers would relieve from 7 a.m. to 8 a to let the cutter girl go to breakfast and to pro the evening shift girl an hour's dinner time. boys received seven cents an hour for this. T also worked after school and during vacati

ANOTHER LOCATION

The Corralitos paper mills were operated u 1902, but the location had been losing its ad tages over a period of several years. The sawn had been moved out of the canyon and there no more redwood slabs for fuel. The wheat fi were being replaced by orchards and berry patc and it was necessary to go as far as twenty mile get sufficient straw to keep the mill going. was a two-day haul by wagon, and it was har the men and the teams. Also, all the water in eam at Corralitos was needed for domestic con- nption. Another site was now necessary.

o again Peter Brown went searching for another ation. In 1901 he went to Antioch, in Contra sta County, to see the straw-paper mill which l been built by Keeney and Sons and which was nding idle. The machine was made of many old ts and the only available fuel was a poor grade coal mined in the hills south of Antioch. How- r, there were great quantities of straw close to mill, an unlimited water supply, and the rail- d and river steamers provided adequate trans- tation. An option was taken on the plant for a -month trial. A short time later, when oil ame plentiful as a fuel, plans were perfected to the mill and move some of the machinery from ralitos. The purchase and improvements on Antioch mill required considerable money, so California Paper and Board Mill was incorpo- ed, and a number of prominent San Francisco businessmen became associated with the company. James Brown had for a number of years been in charge of the San Francisco office of the Corralitos mill, and he and his brother had made many friends who appreciated their integrity and their progressiveness. Their records were of the best.

Before the machinery was moved from Corralitos, a fire broke out in the mill there and the plant was destroyed. That was in January of 1902. Unfortunately most of the insurance had been allowed to run out and the loss was almost a total one. Some dryers and a few parts were salvaged and sent to Antioch. A 48-inch steam strawboard machine was built and placed in the machine room beside the Keeney machine. A wet machine for making air-dried boards was also built. Thus, the plant was a three-machine mill.

One of its principal customers was the Paraffine Paint Company, which bought wallboard and sheathing. In 1950, it built its own mill at Paraffine.

TRANSPORTATION FOR THE FINISHED PRODUCT

The driver, the late Charles Crotchett, guides five horses as they haul seven tons of paperboard from the mill to the railroad station.

ANTIOCH MILL PROSPERS

The Antioch mill grew steadily in size and output. Two more four-cylinder board machines, each of about 62-inch trim and 10-ton daily capacity, were added in the next few years and combination boxboard became the principal output of the plant. But the manufacture of air-dried board, strawboard, rag papers, saturating felt, building papers, and sheathing was also continued. The California Paper and Board Mill's office in San Francisco was in a small building on Montgomery Street.

Bruce Brown, after he was graduated in 1903 from the University of California, went East to get experience in other mills. He worked a year each in board mills at Indianapolis, Indiana; Hamilton, Ohio; and Tonawanda, New York. It was while he was with the Tonawanda Board and Paper Company in the early part of 1906 that his Uncle James wrote he was going East to negotiate for a n and modern paperboard machine. He met Bruce Chicago. The interviews with machine build had been only partly completed when James a his nephew received word of the San Franci catastrophe, the earthquake and fire of April 1906. They secured passage on General Greel special train and were in San Francisco on the th night of the fire. Notices were sent to the tra that because of the destruction of the San Franci office and the loss of records, business would conducted temporarily from the Antioch offi But the Browns found, when they did get throu the military lines, that the office was one of the v few buildings which had not burned and that eve thing in it was saved.

For the Antioch mill a 120-inch five-cylin board machine was ordered from the Beloit I Works at Beloit, Wisconsin. This machine was in operation in 1907 and was the first new a modern machine of its kind to be erected on Pacific Coast. The machine brought the capac of the plant up to 40 or 50 tons a day, depending the orders they received.

One of the products of the mill was paper w board, called "Linwood." It was manufactured pasting layers of the board together by hand pressing them in large screw presses. It was m both as plain and grained board, the graining be done by a transfer printing process directly off wooden rolls.

Bruce Brown, when he went to Antioch in 1 was first a machine tender and then assistant su intendent. His brother Murray began work at Antioch mill in 1907 as a millwright, a trade he learned in San Francisco prior to the fire, and l he became the master mechanic.

Harvey Brown, who provided me with muc the material for this article and gave me most of pictures, has also been active in the paper indu from the time he was a lad.

In 1912, the Brown interests at Antioch were to the Paraffine Paint Company. The latter been the principal customer for the new prod "Linwood," and the growth of the company in building-material lines was the cause for nego tions which soon resulted in its purchase of desirable Antioch mill.

James Brown, feeling that he had reached the of retirement or semiretirement, did not join brother Peter when the latter, with his wife, Ka and his sons, went to southern California in 1

FOUR OF PETER BROWN'S SONS

After the marriage of Peter Brown and Catherine Boyd at John McLaren's home in San Francisco, they made their home in a residence across the road from the mill. Here were born five sons, four of whom appear above. They are, from eldest to youngest, Bruce, Murray, Everett, and Harvey. Ralph was born after this 1890 photograph was made.

PAPERBOARD PAPER WEIGHTS

The second generation of Browns grew up in the paperboard business. The lads in the front line of this mill group are Warren Russell, Carl McElheney, Turk O'Mara, Ralph Brown, Harvey Brown, and Everett Brown. Besides their other junior duties, the boys held down piles of rough dried board on the wagons.

ere Peter and his sons, Bruce, Murray, and
rvey, in conjunction with the Paraffine Paint
mpany, built the Southern Board and Paper
lls in Los Angeles.

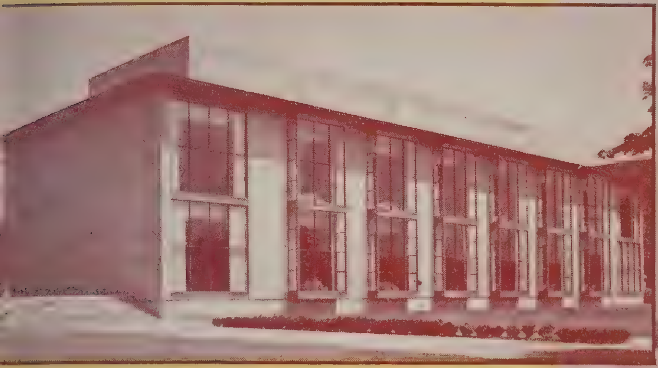
gain, Peter Brown and his wife resided in a
tage near the mill in which he had his interests.
ce was superintendent; Murray, master me-
nic; and Harvey, secretary. In 1915, Ralph, the
ngest brother, joined the firm. The only one
the five brothers who did not make paperboard
nufacturing a career was Everett. He is now Dr.
wn, an eminent historian and doctor of political
ence. He has several books to his credit and is a
mber of the faculty of the University of Michigan.
outhern Board and Paper Mills lasted until the
l of 1917, when it became a division of Paraffine
mpanies, Inc. Peter Brown served as a member
the Paraffine board of directors until he retired
920. His death six years later ended a long career
invaluable service in the paper industry. The
other, who had pioneered with him, died in 1920.
ruce then was superintendent of the southern
ision of the Paraffine Companies; Harvey,
istant superintendent; and Murray, master
chanic. When the plant became the Vernon
vision of Fibreboard Products, Inc., Bruce was
de manager, and also served as a director of the
raffine Companies, until illness caused his retire-
nt September 1, 1947. He had seen the plant
w from a one-machine board mill, with a capac-
of 25 tons daily, to a two-machine mill of 160-
capacity and supplemented by the largest carton
plant in the area. The original site of three acres was extended to more than fourteen, mostly covered by modern factory buildings. Under his supervision, the plant was one of the first paper mills in the country to abandon the old 11- and 13-hour shifts in favor of the three eight-hour shifts a day. Employes at the Southern Board and Paper Mills numbered fifty. When Bruce Brown retired, the plant employed more than seven hundred people.

Harvey is the resident manager of the Vernon plant, a position to which he was appointed in April, 1927. Murray is retiring from his work as assistant plant engineer at Vernon after more than forty-two years in the board mill industry. Ralph Brown's death was the only break in the brotherhood bond.

Katie Brown, as the wife of the pioneer paperboard manufacturer preferred to be called, died in July, 1941. She had celebrated her ninetieth birthday on May 7 of that year, and in the Mother's Day edition of the *Fibreboard Bulletin* her picture appeared on the cover and she was eulogized for her inspiration and guidance to the great family of paperboard makers. As she would have wished, the third generation of the Brown clan is represented in the industry which began more than seventy years ago in the little mill at Saratoga. Bruce Brown, Jr., is chief chemist at the Vernon plant and his brother, Owen, is a member of the sales force.

The sons and grandsons of Peter Brown follow his slogan: "Turn out a good product. It will bring the returns."

The front entrance of the new Charles Hayden Memorial Library which houses the Dard Hunter Paper Museum.



The World's
reatest Museum of
PAPER

By William Bond Wheelwright

Dr. Dard Hunter, for whom the Paper Museum at the Massachusetts Institute of Technology is named, stands beside the paper press he brought from Wookey Hole, Somerset, England.

THE Massachusetts Institute of Technology, recognizing the importance of paper in the advancement of culture and science, has appropriately relocated the Dard Hunter Paper Museum in the new two-million-dollar Charles Hayden Memorial rary, facing Memorial Drive in Cambridge. In the words of Dean John E. Burchard he Division of Humanities and Dr. Vernon D. Tate, director of libraries, this library ves the Massachusetts Institute of Technology an unparalleled resource as a center of nological information and humanistic teaching.''

Vithout paper, which made possible the art of printing, education could never have hed the masses. As H. G. Wells observed in his *Outline of History*, ''One item in the ount must be underlined here because of its importance to the intellectual life of man- d—the manufacture of paper. It is scarcely too much to say that paper made the val of Europe possible.'' Now, for the first time, a great educational center has a eum devoted to paper and paper in its relationship to the graphic arts. Furthermore,

The interior approach to the Charles Hayden Memorial Library. Dr. Hunter's study looks out upon the central courtyard, and can be reached from the library reading room shown here, at the end of the corridor, with open doors.

it can be said without contradiction that the Dard Hunter Paper Museum is the world's greatest. It is an institution in itself. And that institution "is the lengthened shadow of one man, Dard Hunter."

Hunter comes from a long line of printer-publishers, dating back into the middle of the eighteenth century in America, and before that in Scotland. His father was the owner of the *Gazette*, in Steubenville, Ohio, where Hunter was born in 1883. "I was eight or ten years of age," he wrote, "when I was initiated into the noble craft of printing. The foreman of the *Gazette* first instructed me in the art and mystery of typesetting."[1]

In the late nineties, the family left Steubenville for Chillicothe, where the senior Hunter was half-owner with his brother of the *News-Advertiser*, and Dard, who had developed some facility at drawing, was occupied as an illustrator. It was after he had seen in his father's library one of the decorative books by William Morris, and heard his father's description of the famous Kelmscott Press that he became eager to go to England, where later his first deep interest in handmade paper began. His father having agreed that after a few years' schooling, he might go abroad, Dard entered the Ohio State University as a special student, devoting his studies to mechanical drawing, architecture, and oil- and water-color painting. There he also found more books from the Kelmscott and Doves presses of England, which heightened his interest in fine printing.

Chance brought him into contact with a lit
magazine bound in butchers' paper—*The Philisti*
edited by Elbert Hubbard—as well as other boo
from Hubbard's Roycroft Shop at East Auro
New York, which somewhat remotely follow
the style of the Kelmscott Press. In the spring
1903, Hunter left for East Aurora and got his fi
job away from home, with the "Roycrofters
designing all manner of printing, and having t
opportunity to study such foreign art magazines
Dekorative Kunst, which reflected the modern te
encies of the times. This further stimulated
desire for study abroad, an ambition which was n
realized until after his marriage in 1908. On
second visit to Vienna he was admitted to t
Royal Austrian printing school, operated by t
Austrian government, then the most famous sch
of graphic arts in the world. After graduati
from the Graphische Lehrund und Versuchsansta
in Vienna, Hunter left for London to work as
commercial designer, and it was there that he fi
saw paper being made by hand and began collecti
items relating to paper.

The influence on the individual of museums
science and industry could not be better illustrat
than by the effects upon Hunter of his many vis
to the Science Museum in London. There he s
molds for making paper, punches and matrices
making type; an experience which was to determ
his mature career. At the Science Museum he lear
of the celebrated firm of T. A. and C. D. Marsh
of Stoke Newington, North London, where mo
were made and where the dandy roll had b
invented, between 1825 and 1830.

He visited this shop and was graciously receiv
and allowed to frequent its small hand-paper m
where they tested their molds to assure themsel
that they were fit to deliver to the custom
Every afternoon, after finishing his work of desi
ing at the Norfolk Studio, where he was employ
he would go to Marshall's moldmaking sh
where he learned to make paper by hand. At ni
he attended classes at Finsbury Technical Colle
studying toolmaking. At other times he found
opportunity to visit famous private presses.

"I felt I should like to undertake something
the kind myself," he wrote. "I was convinc
however, that simply purchasing the type . . .
procuring the paper from a paper mill left too m
of the vital steps in the process of making bo
in the hands of purely mercenary and unintere
workmen. I desired to set up a private press,

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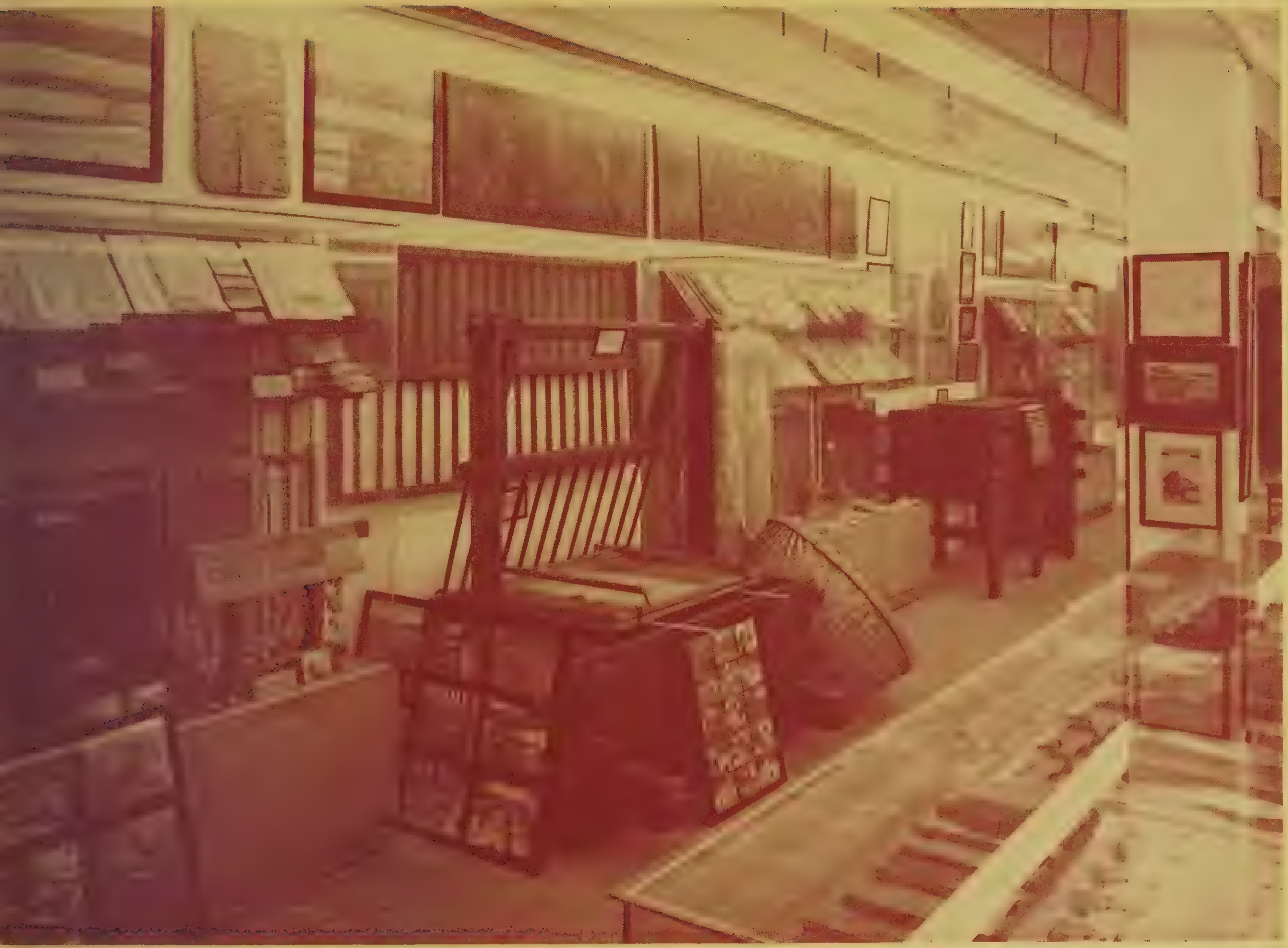
[1] Hunter, Dard, *Before Life Began* (1883–1933), Cleveland, The Rowfant Club, 1941.



Some of the items in this Museum room are a cabinet containing papermaking equipment from the four papermaking provinces of India; vat equipment from Najio, Japan, where the workers sit at their work, hence the low vat. The mold in the background is for making *shoji* paper used in Japanese windows in lieu of glass. The further vat is from Hanchow, China. The wood blocks and prints on the wall are Chinese.

addition I decided that my work must be in-
idual and personal, without reliance on outside
p from the type founder or the papermaker. I
uld return to America and attempt the making
books in every part—paper, type, printing.''[2]
The year 1913 found Hunter in possession of a
turesque estate of thirty-five acres at Marl-
rough-on-Hudson, New York. It has a fair-sized
ook with an eight-foot-high dam, and an early
hteenth-century house of stone and brick. He
ilt a small, half-timbered, thatch-roofed paper
ll, deriving its limited power from an overshot
eel, sufficient to actuate a miniature twenty-
und ''Hollander.'' All other appliances—the rag duster, and cutter, the rag boiler, the vat, and the press—were constructed in the mill. The molds measured 16 by 23 inches, a convenient size for book paper, making both pleasing folio and quarto pages. ''When there was a goodly fall of water the capacity of the mill was about one hundred and fifty sheets of paper a day,'' and this was made without any helpers other than himself.

Hunter's next step toward accomplishing his purpose of ''making books in every part'' unaided was to teach himself the art of type founding, after the methods described in Joseph Moxon's textbook, *Mechanick Exercises: or the Doctrine of Handy-Works Applied to the Art of Printing*, published in London in the year 1683.

1.

"In 1915," he states, "after working several years on the type and two years in the paper mill, I was ready to print a book." Gutenberg had scarcely set himself a harder task, five hundred years before, to invent printing, without attempting also to learn papermaking! Hunter, at least, did not try to make a press, but purchased an old Washington hand press.

Although admittedly disappointed with his first two small books on the subject of etching, and not a little discouraged at times, he still persevered. As he relates, "I developed an intense interest in the history and technique of early papermaking, an interest to which my entire life would be devoted. It was while working in this thatched mill in Marlborough that my real lifework and interest was so forcibly revealed to me; I resolved that should I print books in the future the subjects would be devoted to some phase of papermaking. Aside from two early monographs on etching I have never deviated from this resolution."[3]

The only departure from his original procedures began with the time when William Edwin Rudge printed and published Hunter's *Papermaking Through Eighteen Centuries*, in 1930. Then the author found the writing "little more than play," and reveled in the relief from tedious and exacting work involved in book production.

The gathering of first-hand data and material for his many books on papermaking has involved traveling more than a quarter million miles, spending over twenty-six months in sea voyages, both by sail and steam. It would be hard to name a place where papermaking by hand was in vogue during these years of his travels that was not visited. The Orient, the Occident, Central America, and the islands of the Pacific and Indian Oceans are found in his itinerary. In many of these places the handmaking of paper has now ceased or diminished. At the Industrial School at Rajahmundry, South India, in 1935, Hunter established with two Indians a papermaking department. This had the approval and encouragement of Mr. Gandhi, who told him that along with the art of hand weaving, papermaking by hand would solve many of India's economic problems.

The establishment of the Dard Hunter Paper Museum at the Massachusetts Institute of Technology came about through the efforts of Dr. Karl T. Compton, former president and now chairman of the corporation of M. I. T. But the original plan for building a paper museum was the idea of Geo Houk Mead, president of the Mead Corporati who, as early as 1936, suggested the erection small building for this purpose, on Carlisle H in Chillicothe, Ohio, the home of Dard Hunt When Dr. Compton learned of Mr. Mead's pl appreciating the importance of the collection "paperiana," and feeling the proposed locat somewhat remote, he suggested instead its tablishment at M. I. T.

Inasmuch as the Institute was granted its char in 1861, "for the purpose of instituting and ma taining a society of arts, a *museum* of arts, an school of industrial science and aiding generally suitable means the advancement, development practical application of science in connection w arts, agriculture and commerce," Dr. Compto proposal was deemed appropriate. Hunter Mead both agreed with this, so the Chillico location was abandoned, and the material was set up in 1939, in the William Barton Rog Building at M. I. T.

When plans were later made for erecting Charles Hayden Memorial Library, facing Charles River on Memorial Drive, new quar for the Paper Museum were provided below ground floor and accessible through the Exhibit Gallery. A study is provided for Dr. Hunter, off main room of the Library, in which is kept extraordinary collection of books and pamphl manuscripts, diaries, and letters, of which in m cases no other copies exist. Dard Hunter was pioneer in this branch of collecting, so that m items relating to papermaking by hand, which procured over the past forty years, would be n unobtainable; no duplicates exist.

To mention only a few, the Museum Libr possesses the Ebenezer Hiram Stedman diary of pages, embracing the first half of the ninetee century and giving detailed descriptions of methods of pioneer papermakers of this coun the William Congreve manuscript describing making of watermarks used in the first Engl paper money; and many papers and letters from Matthias Koops' paper mill, established in Lon in 1800. In the Koops' mill was produced earliest commercial paper made from straw, wo and deinked paper, at a time when the Eng people were still unready and unwilling to acc paper made from materials other than time-te linen and cotton rags.

There are many manuscripts relating to

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[3] ibid.

ication of paper and paper products. One ex-
le is the original application for a British
ent, dated August 12, 1788, in which the
entee specifies that he has invented a compressed,
inated paper, suitable for the construction of
uses, bridges, ships, boats, all sorts of wheeled
rs, sedan chairs, chairs, tables, and book-cases."
e is a document that proves convincingly that
inated paper was employed for building pur-
es as early as the eighteenth century, and is not
odern invention.

here are documents dealing with early paper-
king in Europe and America, and many broad-
es encouraging the saving of rags. The Paper
rary embraces every book, pamphlet, and maga-
e article devoted to early papermaking technique
l the art of watermarking.

he original watermarks, both ancient and
dern, run into thousands, and there are examples

of papers from every country and every period. The decorated papers number about 20,000 specimens, and the Oriental and Occidental designs are often consulted by textile designers for making reproductions. The books and prints are periodically used by artists when they seek to develop some phase of historical significance in contemporary advertising.

The Paper Museum is used every year by classes from the Graphic Arts Department of the Harvard Library, the Botanical Museum of Harvard University, the students of library science of Simmons College, various schools of therapeutics, Boston University, Boston art schools, Lowell Textile Institute, and by the various workers in the graphic arts. The Museum has even played its part in supplying material for several motion pictures devoted to the art of papermaking.

Dr. Hunter's services and experience are most graciously extended to all serious investigators,

Showing cases of books relating to papermaking, including all of the textbooks used prior to the introduction of the paper machine; also a case is devoted to the evolution of the beater, from about 1690, when it was conceived, to the present day. The models are of native paper mills in Kashmir and Indo-China. Other cases devoted to printing, bookmaking, and other related subjects.

The south wall of the Museum, showing a series of prints relating to paper and papermaking. The cases display the tools for making marbled paper and other decorative papers. One case is devoted to early papermaking in Massachusetts, showing early molds from the mill of Caleb Burbank, who made a great deal of the paper used by the Worcester printer, Isaiah Thomas.

students, and scholars. Despite the fact that no one else could bring to bare anything approaching his knowledge and experience of the techniques and history of ancient papermaking, no exception has been made to the retirement rule at M. I. T., so Dard Hunter, now "emeritus," is continuing as the Honorary Curator awhile.

His time is occupied in writing about papermaking, and in answering questions regarding the many rarely remembered phases of this 2,000-year-old industry. It is only necessary to look through the Museum files to find that Dr. Hunter has examined paper for many different purposes. He has been called upon by the Fogg Museum, to determine whether or not various papers used in paintings, etchings, and engravings were authentic and of the proper period for the art work under question. Forgeries are often detectable from the paper used by artists.

A striking instance wherein paper playe
decisive part was in connection with the reconst
tion of Mount Vernon. The Committee in ch
wished to reproduce the paper that was suppose
on General Washington's bedroom at the tim
his death in 1799. Many layers of paper were ta
from the walls, and after careful examinat
Hunter determined that only one of the sam
could have been on this room at the tim
Washington's death. This was only a fragment
larger than two postage stamps!

A recent request came from Thomas John
who will work this summer over the paper
Emily Dickinson, which were recently present
Gilbert Montague to Harvard. This research i
be pursued with the hope of establishing
chronological order of her writings. Another
request was from the library of the Universit
Virginia, relative to the watermark, "S

ler," found in an undated letter which the
ary wished to classify under a definite date.
necessary facts were disclosed from this water-
k.

quiries from the Institute of Science, Manila,
ut papermaking in the Philippine Islands have
n satisfied. A request from the Rothersthorpe
ool of Northampton, England, for samples of
ve paper made in Tonkin, north Indo-China,
immediately gratified. Dr. Hunter was also
sen to examine the famous "Pumpkin Papers,"
the defense, in the trial of Alger Hiss. Philat-
s have applied for assistance regarding early
erican stamp paper. Descriptions of the first
er machines have been supplied to Edward
rmeister, well-known author and paper au-
rity.

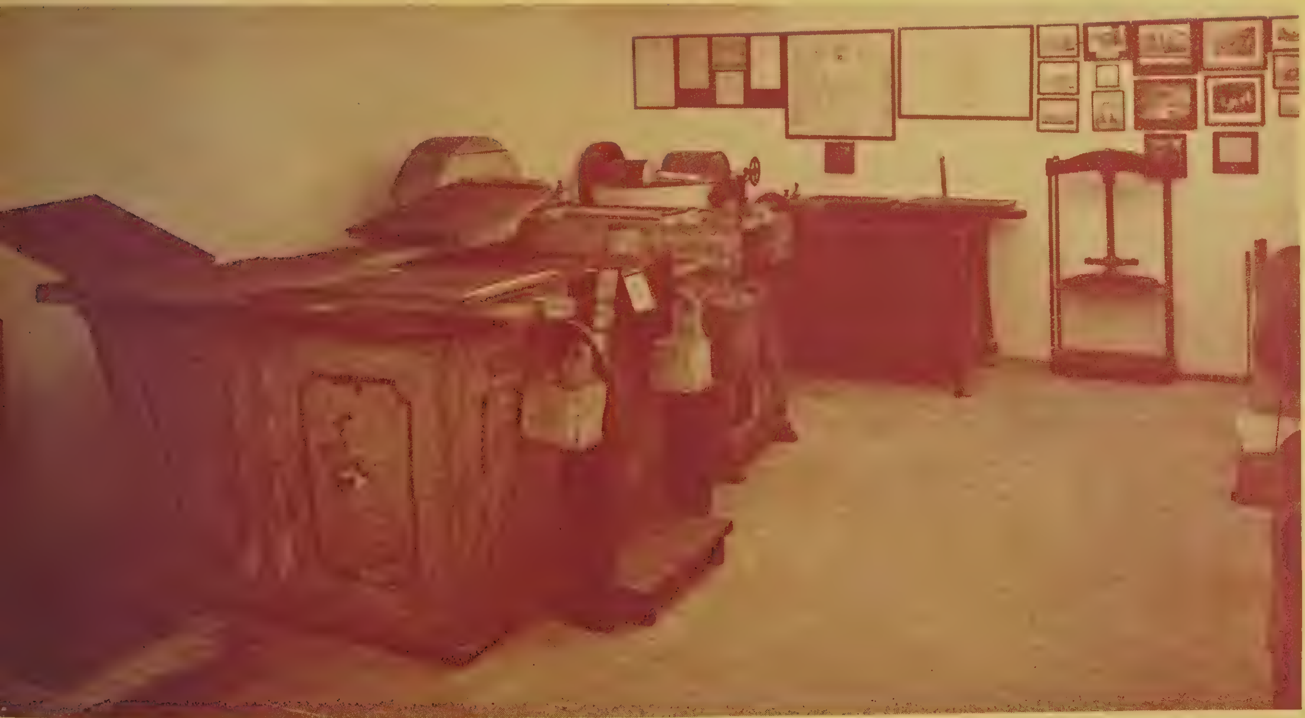
nough has been told to demonstrate that a great
y of such questions and requests could only be
perly answered by one who has devoted a life-
e to the study of papermaking, in all countries
in all centuries of the art.

he Dard Hunter Paper Museum is also repre-
tative of the graphic arts. The exhibits show ancient Oriental methods of reproduction, wood blocks, engravers' tools, and printed matter, including specimens of the very first printing upon paper—the *dharani*, or prayers, sanctioned by the Empress Shotoku, of Japan, about the year A.D. 770. Here one also finds an engraver's press, a real lithographic press, and a Washington hand press, together with representative work done by letterpress, intaglio, and planograph methods, all by hand.

Dard Hunter's contributions to the bibliography on paper, in addition to other articles, now include twenty-three books, of which eight have been produced on his own presses and own handmade paper; some are printed by type he designed and made. Every part of the production of these eight volumes, except the binding, is that of Hunter, or, lately, with the assistance of his son, Dard, Jr.

The latest and most interesting volume, *Papermaking by Hand in America*, will be ready for distribution late in 1950. It embraces accounts of American papermaking from the beginning, in 1690, to the year 1817, when the paper machine first came into use in the United States.

The book is a large folio, measuring 12 by 17



The vat equipment brought to America by Dard Hunter for the Museum was formerly used in the old Hodgkinson Mill at Wookey Hole, Somerset, England. This is the type of appliances now used for making fine handmade paper.

inches, of 350 pages, all printed on a hand press upon Dard Hunter's own handmade paper, from his Lime Rock mill, Connecticut, which he only recently sold.[4] The type was made especially for this edition by Dard Hunter, Jr., who designed the type face, cut the letter punches in steel, sank the matrices in copper, and cast the types and ornaments, all done in Hunter's private press at the Mountain House, Chillicothe, Ohio. This press is the only publishing house in existence where books can be made in their entirety—paper, type, composition, printing.

In addition to the descriptions of mills in eighteen colonies and states where paper was made by hand, prior to the introduction of the machine, the book is illustrated with more than one hundred tipped-on reproductions and facsimiles; also, there are many watermarks reproduced in actual paper from the originals in the Hunter collection. This compilation has extended over almost twenty years. The production has occupied more time and represents more hand work than any book produced in America during the past century. The edition will be limited to 210 copies. Except for the binding, it will be the exclusive work of the Hunters, father and son.

Dard Hunter is a man of conspicuous mode
and deep sincerity. Since 1915, while working
his thatched mill at Marlborough-on-Huds
where his "real lifework and interest was so fo
bly revealed" to him, he has never deviated f
his resolve "to print books . . . the subjects of wh
would be devoted to some phase of papermakin
Honors have come to him unsought, and i
evident to his friends that he would prefer to
judged by his works. Unlike many academici
it does not injure his feelings not to be addresse
"Doctor." Nevertheless, he has been honored w
three high degrees: Lit.D., Lawrence Coll
Appleton, Wis., 1931; Lit.D., Ohio State Uni
sity, Columbus, Ohio, 1939; L.H.D., Woo
College, Wooster, Ohio, 1946; and by receiving
1949, the Rosenbach Fellowship from the Uni
sity of Pennsylvania. In addition, the Gold M
of the American Institute of Graphic Arts
bestowed upon him in 1931, and the Ohioi
Medal in 1945.

Honorary membership has come to Hunter f
the Club of Odd Volumes, Boston; the Row
Club, Cleveland; and he is Honorary Presiden
the All-India and Burma Paper Association.
it is easy to imagine that nothing has brou
Dard Hunter more satisfaction than the recogni
implied by his election as an Honorary Membe
the American Pulp and Paper Association. Ab
all, his books and the Paper Museum assure hi
permanent reputation in the annals of papermak

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[4] The craft of making paper by hand was revived in the U. S. at Lime Rock, Conn., by Dard Hunter Associates. It ceased operations in 1931, but remains today the only fully equipped handmade paper mill in America. After the dissolution of the Associates, the property was purchased by Mr. Hunter, and was sold by him in June, 1950, to D. C. Everest, of Rothschild, Wisconsin.

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**Papermaking by Hand in America*, 1690–1811, Chillicothe, 1950

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*Printed and published by Dard Hunter

THE MIRACLE OF PAPER

Our pioneer papermakers whose mills were situated beside sparkling streams molded their stout sheets with patient care and skill.

These fibers contributed to the fiber and sinew of our newly formed democracy . . . in stirring tracts and pamphlets that projected deep-set principles.

Paper . . . out of it was made our Continental currency, copies of the Declaration of Independence, and other imperishable documents for all to read.

Paper . . . it is the most malleable of mediums . . . the most receptive to impressions. Its slender sheets fit into machines of super-human skill that register amazing effects.

Today . . . great mills dot our nation . . . fed by giant forests. Papermaking is now a major industry. Whole carloads often enter into the production of a single edition of a book, or of our many magazines.

Abundant paper populates our land with the printed word in all its manifestations . . . keeps ideas in motion . . . exercises thought without pause. Without paper . . . commerce would be without records and there would be no mails.

Paper, one of the most versatile of substances, serves from the humblest mimeographed bulletin to the most elegant document on handmade stock.

Billions of sheets each year carry messages and records that expedite the advance of our nation to new highs.

—P. K. Thomajan

PAPERMAKING

IN

IRELAND

By Denis Kelleher

SOUTH of Dublin the Wicklow Hills rear their near-naked summits to the rain. On their lower slopes three folds of ancient Silurian strata catch headlong streams damming them into pools, long, deep, and sandymouthed, as perfect filtering beds as nature ever devised. Better water for washing linen one could not wish for—linen for a lady's back or for the "breaking in," it makes no odds. In the early sixteen hundreds they made paper here, samples of which extant today[1] prove its whiteness, texture, and uniformity.

It was the "lightness" of the hill water and the "unique supply of the whitest linen rags" that induced Nicholas Dupin to set up here, in 1691, the "Company of White Paper Makers of Ireland." A Huguenot, expelled from France after the revocation of the Edict of Nantes, Dupin had all the business acumen of his fellows. The company he founded was the first joint-stock concern in the Three Kingdoms. He it was who brought from Amsterdam the first Hollander beating machine, with newest type of strainers of brass wire. He would have accomplished much but "the mere rumour of a rise of industry in Ireland created a panic in the commercial circles of England."[2] In 1697 he sold out, and wisely, for in the following year the only remaining Irish industry[3] that showed any signs of success was banned. According to Swift's *The Present State of Ireland*,

[1] Ussher, James, *Britanicarum Ecclesiarum Antiquites*, Dublin, 1638. *Annals of the Four Masters*, mss. 1648.

[2] Fronde, J. A., *English in Ireland*, vol. I., p. 444.

[3] Woollen manufacture, which was restricted by the 10th William, 1698.

1726, "the repeated clamours of English weavers produced this Act."

The purchaser of Dupin's mill was one Perry, but whether he made paper at all we cannot say.

HESITANT

Egged on by Swift's *Drapier Letters*, 1724, the Irish House of Commons took upon itself the nettlesome task of fostering Irish manufacture. Paper mills began to appear mushroomlike on the banks of the streams from the south. Templeogue, Tallaght, Old Bawn, Drimnagh, and fourteen other mills are listed in petitions to the British Parliament, which held powers of veto and of overriding legislation for colonial parliaments. In the year 1737 Thomas Slater, claiming that he "had brought the art of papermaking to perfection in two mills at Rathfarnham," asked for a grant of £500 to build "a new mill after the approved Dutch manner." It was a bold step for the Irish House to countenance such petitions. Paper production went up dangerously but so did the imports from England. The industry had hit a great boom, thanks to the versatility of the paper stainers. There was a craze for imitation chintz "mounted on canvas and stretched on wooden frames." Every fire screen called for an imitation in oils, ceilings demanded faked stucco, and unsightly walls cried out for "superfine impost [embossed] tapestry," which was soon to evolve into wallpaper. There were French, Indian, Chinese patterns everywhere.

Dublin in those days was the second largest city in the empire, but it had no industries. It kept up a tenuous reputation for miniatures, engraving, interior decoration, and bookbinding,[4] but its ships grew seaweed in the bay, the result of the Navigation Act of 1660, and the best among its weavers sat by looms in far Maryland. Yet so blind were the times to economic forces that only a few discerning souls —Swift, Archbishop King, Hely-Hutchinson —were aware that a great calamity had befallen them. Just when English capital and enlightenment were coming together to bring forth the industrial revolution, money and talent in Ireland were bent more and more on wild pleasure. The streets of Dublin were gay with dashing bucks and strutting beaus. The rou
of balls, levees, and revels continued winter a
summer; rents on land had been raised to s
an extent that even gallant duellists dared
spend any time on their country estates. Th
Lords of the Soil lived for pleasure in w
ought to have been a trading city. To th
indeed, the city's trade was a tainted thi
Only Quakers regarded trade as at all hono
able, and when trade restrictions came it
they who mainly felt the pinch.

As for the mass of Irishmen of native st
it may be said they were "below trade
They had been left almost entirely unaffec
by the four great movements—the Crusad
the Renaissance, the discovery of America,
the Reformation—that had orientated the
ropean mind toward commerce. They w
about to miss the fifth and most important,
industrial revolution. Of enterprise or ambit
in the modern sense they knew nothing.
good song outlasts a mountain of gold" s
the poet O'Roddy, believing he had sol
life's problems. Hardy of body, men and
men of this race could endure with glee
seasonal rush of agricultural work. In
comparatively easy monotony of industry t
gave little satisfaction. "The moment an o
seer quits them they invariably drop their wo
take snuff and . . . .The most trivial occurre
especially in the sporting line, will hurry th
unless restrained, from their occupatio
They were also given to "visionary expectati
of sudden opulence without previous lab
which are a reproach to a country and muc
the bane of commerce and manufacture."[7]

It is only when the industrial apathy of b
planter lords and "mere Irish" is borne in m
that one can understand how the oppositio
trade restrictions in Ireland was so weak
futile. Thus, in the year 1765 when Grenvil
Act extended the British system of stamp du
to the colonies, there arose in America a fur
that was not to abate until it merged in
general struggle for independence. The sa
Act was received in Ireland with a silent b
Though the Act was repealed before being a y
in force, it was reimposed in Ireland by cons
of the Irish Government in 1773.

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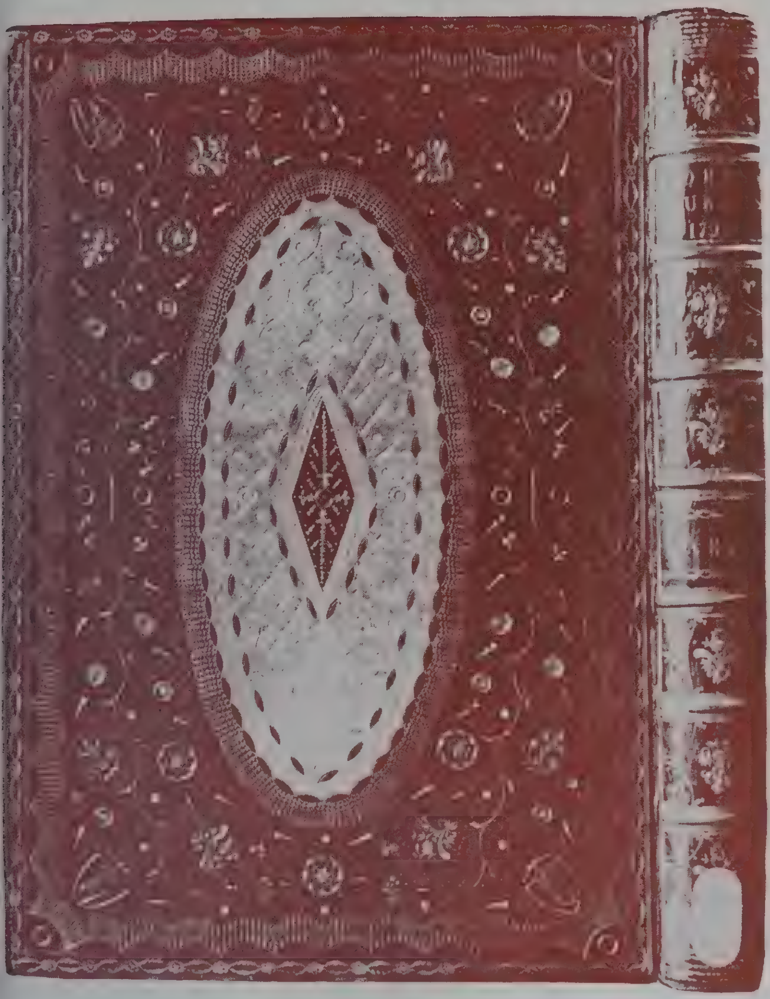
[4] Toynbee's, Mrs. Paget, ed., *The Letters of Horace Walpole*, vol. V, p. 162. 30, Dec., 1761 "P. S. I am told they bind in vellum better at Dublin than anywhere; pray bring me any one book . . . ."

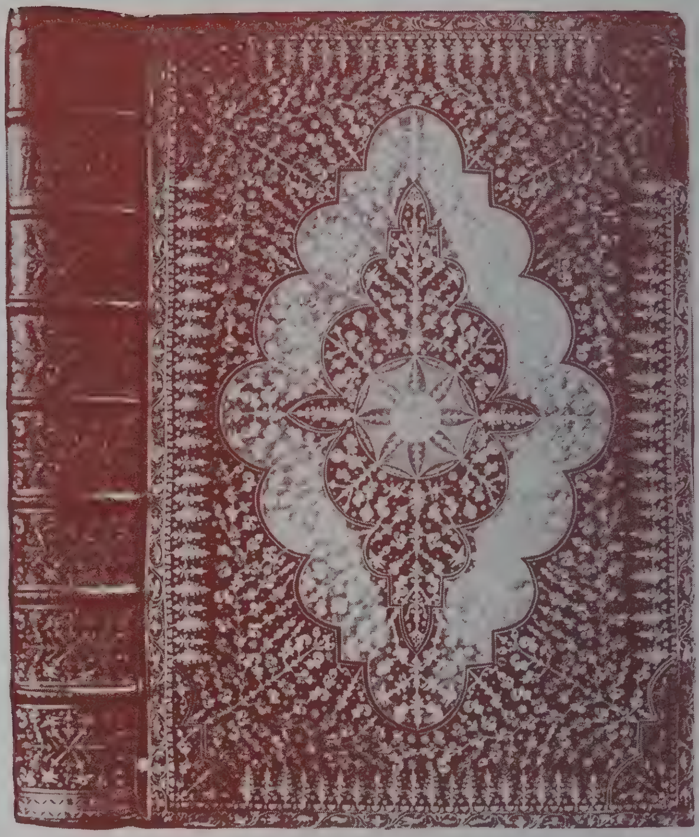
[5] Kane, Sir Robert, *Industrial Resources*, p. 322.

[6] Crumpe, Samuel, *Essay on the Best Means of Providing Employment for the People*, Dublin, Mercier & Co., 1793, p. 155.

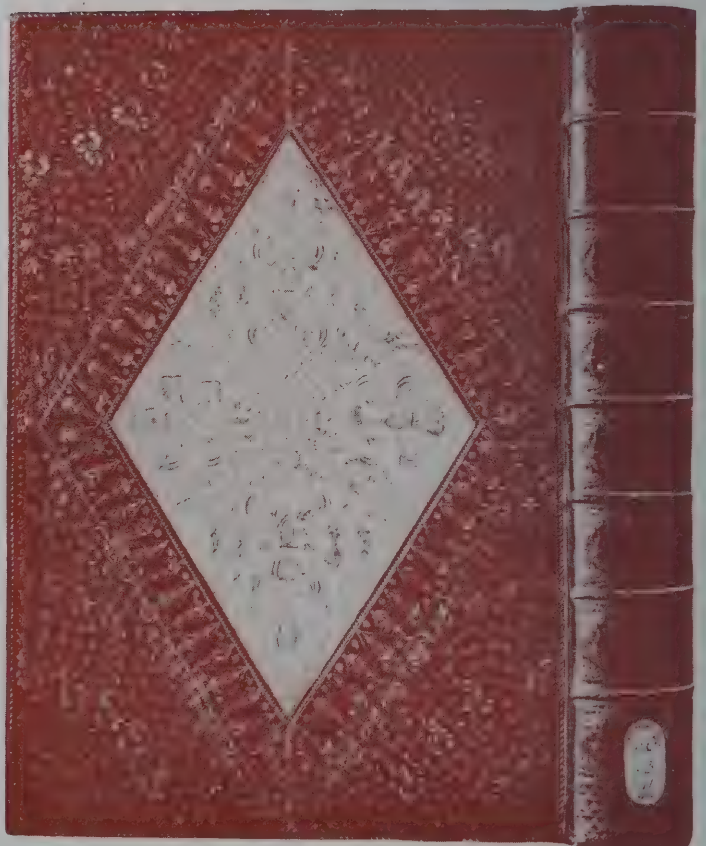
[7] Preston, William, "Essay on the Natural Advantages of Ireland," 1796, *Transactions of the Royal Irish Academy*, vol. IX, p. 192. (Fair comment and true. Should be weighed against: "It is observable that the Irish in every country but their own advance with equal firmness and address and distinguish themselves in arts, commerce, war and letters." *ibid.* p. 176. or, "There were indeed Irish Roman Catholics of great ability, energy and ambition but they were to be found everywhere except in Ireland." Lord Macauley. or, "The want of trade with us is rather owing to the cruel restraints we lie under than to any disqualifications whatsoever in our inhabitants." Swift, *The Present Miserable State of Ireland*, 1726.)



Eighteenth-century Irish bookbindings were invariably done in red morocco, gilt-tooled, with a large diamond-shaped inlay of white vellum. Sometimes cream leather was used instead of vellum, in which case the inlay tended to be elliptical. • Originals of the example shown here, and of the two overleaf, may be seen in the National Library, Dublin.



Two examples of eighteenth-century Irish bookbindings.



o great was the demand for interior decora-
ıs that the Stamp Act does not seem to have
med Irish papermaking to any great extent.
w for the first time exports of paper, wall-
ers, and books are recorded. No copyright
lied in Ireland and so Dublin printing
sses profitably turned out "execrable edi-
ıs"[8] of classic works for the American mar-
. Shipping news in the *Dublin Evening Post*
November 13, 1783, carried such items as:
lichael Boylan, Paper-stainer, Grafton
eet, today loaded 6,000 yards of Irish Paper
ngings for Philadelphia." The Irish Par-
nent of 1782, called Gratton's Parliament,
away with noxious port tolls and quotas
pledged itself more strongly than ever to
er industry. It sought free trade and through
erican example aspired to independence.
the credit of the papermakers be it said they
not fail to answer the call. Many of them
alled steam engines to eke out their now
rworked water wheels. A British officer,
ing visited Slater's works in Rathfarnham,
ote, "Candour obliges me to observe that I
e not seen more judicious arrangement in
mills of England or Holland."[9]

ENTER AND EXIT—THE NUNNS

he Nunn family had long been making
er in a small way. A junior member typi-
ly advertised himself thus: "The manufac-
e of writing paper is carried on in a very
proved and extensive manner by Richard
nn, No. 46, Bridgefoot St., who has studied
th peculiar attention . . . the best means of
nging that branch to perfection . . . and can
all times furnish the wholesale buyer with
nplete assortments."[10] In 1793 this same
hard admitted into partnership Clement
ylor, member of parliament for Maidstone,
gland, and owner of a mill there. The year
95 saw a duty of 2d. a pound imposed on
er made in England, so Nunn-Taylor de-
ed to transfer the Maidstone mill to Dublin.
a cost of £25,000 they brought over all the
chinery together with the workmen, fore-
n, and millwrights. But before this promis-
concern could get under way Taylor became
nkrupt and quit.

As early as 1785 a committee of lords had entertained a petition of English papermakers on the subject of the alarming growth of Irish Mills.[11] There were later and more insistent petitions, especially after 1795 when the paper tax was levied in England. It came as no surprise, therefore, that the tax was extended to Ireland in 1798. It caught Nunn before he had firmly found his feet. In November of that year a bankruptcy commission was executed against him. He sought the aid of the Irish Commons and his petition was laid on the table of the House. That august body was, however, much engrossed with its own affairs, intent as it was on hara-kiri. When in the following year the Commons voted itself out of existence, the Nunn family disappeared from the Irish industrial horizon.

ON THE RUN

The Act of Union, bringing Ireland directly under Westminster, became law in 1800. For long it had been held out as golden bait to Irish industrialists. Through it, all the "cruel restraints" would be lifted, and they would be as free as their British rivals to send goods to any corner of the world. Across the Atlantic there was a market for what they had to sell "as the Americans find it most profitable to employ their whole capital in clearing lands, in cultivating the earth and exporting the produce, instead of turning any part aside to speculate in manufactures."[12] The Irish papermaker had especially bright prospects held out to him. He was reminded again of the "unique supply of whitest linen rags" at his disposal, though the source of that supply was by virtue of the forthcoming Act about to transfer itself to London in the wake of parliamentary high society. It was suggested that he might outmatch the British mill owner as "the intimate knowledge of linen processing may suggest many useful experiments."[12] He should copy from the French, "who with all their extravagance [Britain was then engaged in desultory war with the Directory] are capable of affording useful lessons to the world."[12] The secret of their success was given him gratis, and according to Preston, ". . . the material is cut into

[8] *ibid.*, p. 406.

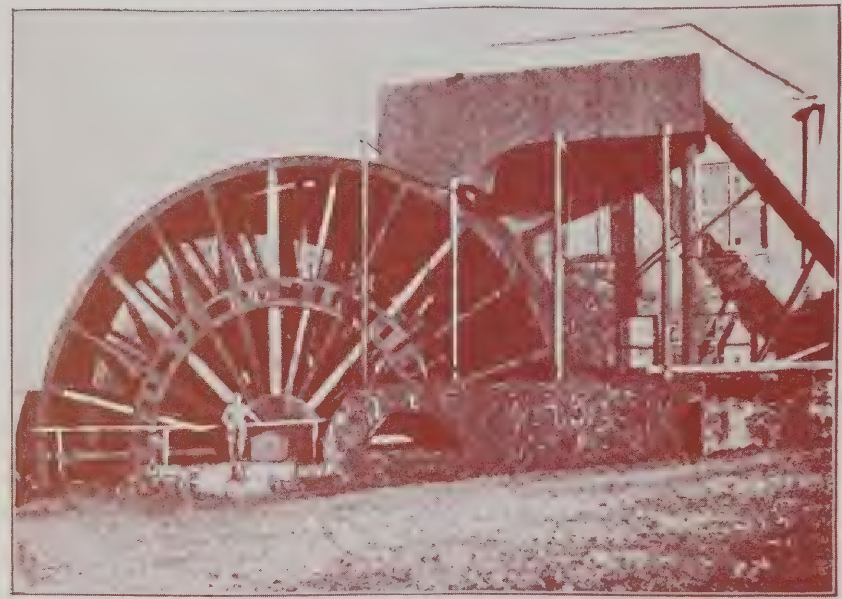
[9] Bowden, C. T., *A Tour Through Ireland*, 1790.

[10] *Gentlemen and Citizens' Almanac*, 1779.

[11] "English Lords Committee on Irish Trade," 1785.

[12] Preston, pp. 188, 273, 281.

longer filaments . . . no smalt is used . . . they observed a peculiar nicety in the degree of trituration." Equipped with that nicety, he could make paper so tough that "if you fold up a sheet of it and pass it through the ring of a half-hundredweight, you may raise the weight and wield it round your head without any other hold." His trade had compliments paid to it in nicely balanced sentences, ". . . we are indebted not only for the diffusion of science but also for the improvement of religion," and the demand for it, "instead of fluctuating with the caprice of fashion will endure till the end of time." He was promised that scientists would be induced to "consider the humble details of manufacture," as "some French chymists [Berthollet and Lavoisier], who have studied to make philosophy useful by a practical application to arts and manufactures, have taught us the use of muriatic acid for deterging and whitening the rags for paper."


The great water wheel, built 1848, was 53 ft. high; it took 18 tons of water a minute in its 26-inch buckets and shared with a steam engine the powering of the upper mill, Swift Brook.

In the new dispensation even the vagaries of the workmen would be counteracted. Preston continues, "Were a committee of moral inspection established in each district it might effect wonders in the great work of promoting regularity of morals and industry." It was h "by reward and punishment, by precept example, to reform the conduct of the o As for the young, he says, "Those chil should be highly rewarded who should be at the earliest age to earn the largest dail weekly sum by their own labour." That last point needed elaboration must have st even the hollow breast of the learned poli economist, for he continues, ". . . prizes of kind afford more real satisfaction to the d than gold and silver cups for jockeys running cattle" [sic].

There is evidence that Irish manufact accepted these promises at their face va During the last six months of 1799, lice taken out for papermaking numbered 29; for paper staining and hangings, 50. century-old dream of "unfettered trade" taking on reality at last. Their own enthus had blinded them to the fact that there taken place a great change since the time m factures in glass, leather, and wool were pressed. Under most solicitous state protec British industry had grown up. But once established and sure of its strength, it rea consented that all trade barriers be remo By the time of the Act of Union the En paper manufacturer had amassed capital had a pool of cheap but industrially mi labour to draw on; and, besides, in his le he had planned a new marketing techn This last he tried out by cut-pricing his ex to Ireland. His offensive caught the Irish owners in their jubilation. Their sales c as prices dropped below production costs. wise among them closed down.[13] There no use harking back to fine promises of pro and an easy market among the Ameri "who employ their whole capital in cle lands, in cultivating the earth," and so

The paper duty nominally remained changed at 2d. a pound, but with the fa prices it came to represent well-nigh 5 cent ad valorem. The war against Nap was proving so costly that in 1804 the dut to be raised to 3d. a pound. Thus, a hun weight of paper priced at 50s. was dutiab the extent of 37s. 4d. The temptation to e

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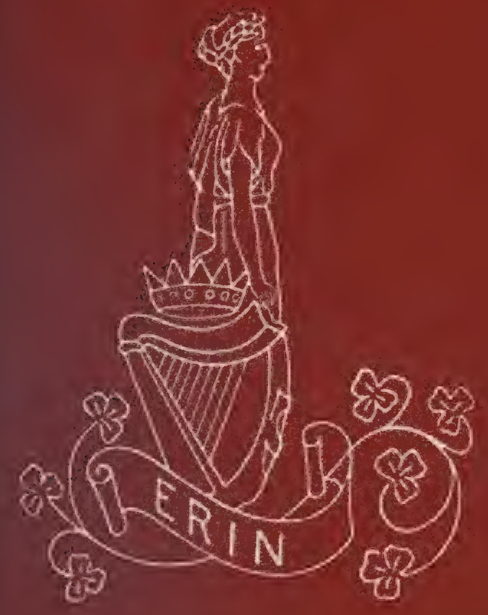
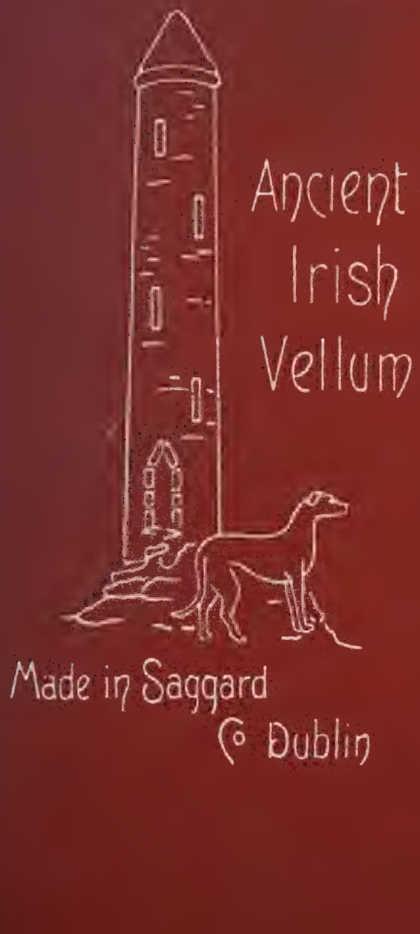
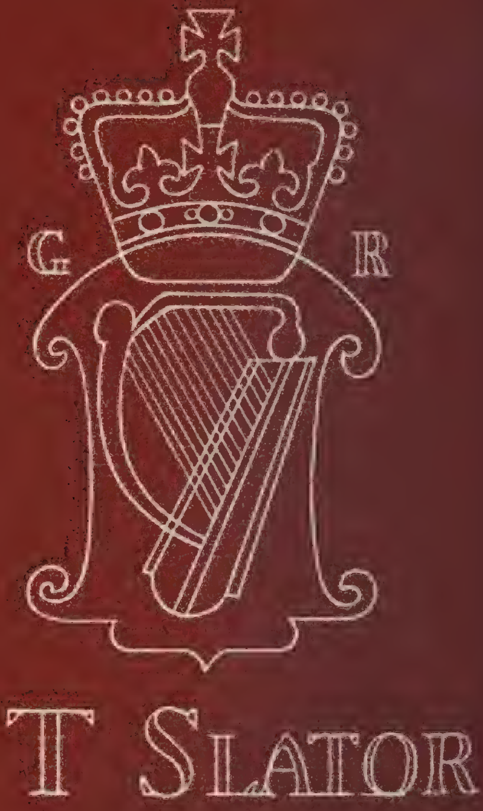
[13] *Letter to Sir Robert Peel*, 1818. "In 1800 we had 17 paper mills employing 2000 people; we have now five."



atermarks, after Burch, *World's Paper Trade Review,*

Watermarks used by McDonnells,
owners of Swift Brook Mill
until the 1880's.





Watermark used by
Thomas Slator, of
Rathfarnham, 1756.

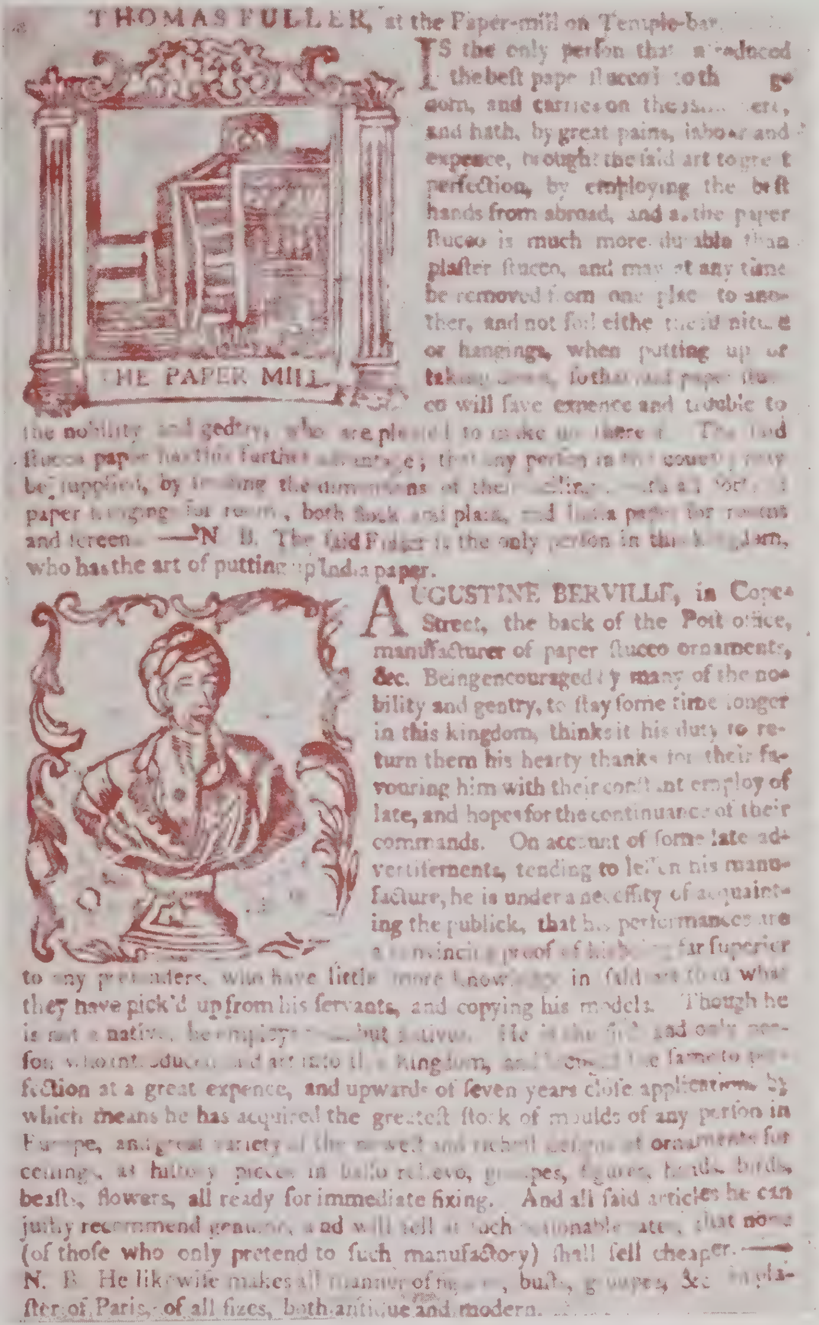
Watermarks from Ussher's
Britanicarum Ecclesiarum Antiquites,
printed in Dublin, 1638.

t high tax proved too strong for most of the h mill owners who struggled to remain in duction. Parliament found it necessary to w up more stringent regulations governing paper tax in Ireland.[14] Indeed the sapient kers of law had not for a moment been taken Since the tax was first imposed they had eseen the dishonesty with which it would met in Ireland, and they had forestalled all h by imposing a minimum monthly duty of 6 13s. 4d. on every beating engine. This gine duty had a most deleterious effect on sh papermaking: it practically compelled the ll owners to overwork their beaters, cutting t the "double washing" so necessary to the tter-class papers. In 1800 the engine tax was sed and in 1805 raised again so that the ure stood at £32 19s. 8d. a month. Between 05 and 1818 ten further Acts were passed hich dealt specifically with the paper tax in land, and did not affect England.

It was provided that unpaid excise dues could recovered from Irish papermakers by dis- int on their raw materials, paper, or plant, of which could be sold by auction six days er execution of notice. No mill could start rk without permission from the excise thority, and once started it was assumed to in constant production and taxed accord- gly, unless formal notice of shutting down given. Nor could it shut down except on e morning of the fifth day of one of the onths, May to October. The beater had to securely fastened to the satisfaction of the cise man and the plates and bars delivered to his custody.

No paper could be removed from an Irish ll unless bound in reams, which proved kward for mills equipped with Fourdrinier achines, and in the officially stamped wrap- rs, and then only on a signed permit from the ea excise officer. Infringement of any of these gulations entailed liability to heavy fines and, some cases, to penal servitude for as long as ven years.

Along with paying tax a crippling yearly cence had to be taken out by all papermakers d paper stainers. In 1816 it was laid down at the papermakers must hand over a £300


THE PAPER MILL

THOMAS FULLER, at the Paper-mill on Temple-bar.

IS the only perſon that [illegible] introduced the beſt paper ſtucco into th[illegible] kingdom, and carries on the ſa[illegible] [illegible], and hath, by great pains, labour and expence, brought the ſaid art to great perfection, by employing the beſt hands from abroad, and as the paper ſtucco is much more durable than plaſter ſtucco, and may at any time be removed from one place to another, and not ſoil either the [illegible] [illegible] or hangings, when putting up or taking [illegible], ſo that [illegible] paper ſtucco will ſave expence and trouble to the nobility and gentry, who are pleaſed to make uſe thereof. The ſaid ſtucco paper ha[illegible] [illegible] further advantage; that any perſon in the country may be ſupplied, by ſending the dimenſions of their ceilings, [illegible] all ſorts of paper hangings for rooms, both flock and plain, and India paper for rooms and ſcreens.—N. B. The ſaid Fuller is the only perſon in this kingdom, who has the art of putting up India paper.

AUGUSTINE BERVILLE, in Cope-Street, the back of the Poſt-office, manufacturer of paper ſtucco ornaments, &c. Being encouraged by many of the nobility and gentry, to ſtay ſome time longer in this kingdom, thinks it his duty to return them his hearty thanks for their favouring him with their conſtant employ of late, and hopes for the continuance of their commands. On account of ſome late advertiſements, tending to leſſen his manufacture, he is under a neceſſity of acquainting the publick, that his performances are a convincing proof of his being far ſuperior to any pretenders, who have little more knowledge in ſaid art than what they have pick'd up from his ſervants, and copying his models. Though he is not a native, he employs [illegible] but natives. He is the firſt and only perſon who introduced ſaid art into this kingdom, and brought the ſame to perfection at a great expence, and upwards of ſeven years cloſe application, by which means he has acquired the greateſt ſtock of moulds of any perſon in Europe, and great variety of the neweſt and richeſt deſigns of ornaments for ceilings, as hiſtory pieces in baſſo relievo, groupes, figures, heads, birds, beaſts, flowers, all ready for immediate fixing. And all ſaid articles he can juſtly recommend genuine, and will ſell at ſuch reaſonable rates, that none (of thoſe who only pretend to ſuch manufactory) ſhall ſell cheaper.—N. B. He likewiſe makes all manner of [illegible], buſts, groupes, &c. in plaſter of Paris, of all ſizes, both antique and modern.

Rival advertisers placed together in an eighteenth-century advertising journal. Paper stainers, paper stampers, flock makers, and papier-mâché manufacturers had always displayed great energy in advertising. In the 1750's competition among the leading firms reached fever heat. John Gordon at the sign of Hibernia, Thomas Fuller at the sign of the paper mill, Augustine Berville at the sign of Augustine Berville, and Thomas Ashworth on the Blind Quay, claimed, each one for himself, the honour of being the only "true stuccodore" in the kingdom, and the only person to have incurred the enormous expense of bringing the "said art" from France.

Needless to say, it was the proprietors of the journal who gained.

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[14] George III, Number 45, "The laws in force in Ireland for the collection of duties on paper made in Ireland . . . are insufficient and it is expedient to amend the same."

bond for each beater.[15] Two years later, in place of the engine duty a tax of 12s. 6d. a cubic foot was levied on all beaters, the capacity to be calculated by multiplying greatest length by greatest breadth by greatest height. The excise staff was increased to a point where the tax collected barely covered the expenses of collection. In 1812, the record duty year, £19,314 was the total amount.[16]

Everybody knew that it represented less than one-tenth of the actual paper output. Mr. Pape, collector of excise, in his evidence before the Commissioners of Excise in 1833 described the Irish papermakers as "adventurous men of little capital." For a person in his position, the choice of words shows commendable restraint. One notices something akin to resignation as he continues, "though my officers stand by the machines all day, high pressure does not commence until the night."

During this time many mills ostensibly changed over to the grinding of corn. The beater was locked up and bars and plates duly handed over to the excise man. But before last farewells were completed the fitters were at work and substitute bars and plates in position. Thereafter, "grain carts" from the mill would call at the back entrance to stationers and deliver quires and reams wrapped not in official stamps but in sacks. What with English cut price and contraband native papers, prices fell so low as to bring all honest firms to despair.[17]

Though contraband was rampant, law breakers had not matters their own way all the time. Almost a complete list of the working paper mills could be compiled from the records of the courts. In 1829 a sum of £1,628 was paid in penalties. In 1848 the fines totalled £3,947 but only £1,354 was collected, owing to the insolvency of the offenders. One Cork papermaker who was fined £100 held assets valued at £7 10s. 0d.

SUBDUED

Half a century of legal attrition wore down the "adventurous men." Esparto grass delivered the coup de grâce. It was when they had all been put out of business that somebody discovered that a tax on paper was tantamount to a tax on knowledge. With a flourish it repealed, in the year 1861. The numb papermakers who still kept working an h business was very small. They were cert not of the "adventurous" kind. They little captial and had good reason to be tious.[18] Moreover, they depended to an growing degree on the good will of fo combines. From them they had to buy materials and fuel. To them they sold finished product in bulk, as was stated in dence before the Royal Commission on Industries in 1885, their activities being ually confined to the rougher sorts of pa

Some there were in Ireland who, f patriotic motive, preferred to have wr papers homemade and home-wholesaled. were supplied with excellent quality cream stationery by Swift Brook Mills and cream manuscript papers by Ballyclare Mill, Co Antrim. But it was at a price that amou to sacrifice. The general comment of the is echoed in a report made by the Amer Consul in Dublin, A. K. Moe, to his Gov ment, in the year 1905. ". . . the cost of pro tion in Ireland seems to be so great tha attempt is made to compete with the Eng paper manufacturers . . . . Hence 'patriot costs the purchaser 66⅔ per cent prime cos

BOLSTERED

That the figure given by Mr. Moe w realistic estimate is borne out by the fact one of the first Acts of a new native Gov ment bent on the revival of industry wa impose a 50 per cent ad valorem tarif imported stationery. From 1926 to 1946 output of native paper increased twentyf Since the late war exactly half our pape quirements are supplied by home mills. industry employs some 3,000 people and a small dividend, for which benefits the cou as a whole is charged 30 per cent more t need be for writing papers.

More significant than the tariff on for paper is the action our Government has ta with regard to reforestation. In the sixtee and seventeenth centuries Ireland was denu of trees and no worthwhile effort at replan was made until 1926. Spruce and fir grow

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[15] George III, Number 56, c. 78.

[16] Burch, *World's Paper Trade Review*, June 27, 1911. "For so paltry a sum was the elaborate machinery of the excise laws set in motion against the humble paper makers."

[17] Burch, *Worlds' Paper Trade Review*, March 3, 1911. "Swift Brook Mills paid one-quarter of the duty collected though they did not make more than one-eightieth of the paper made in the country."

[18] *Paper Mills Directory*, 1874. "The Irish trade has dwindled until it may be said to be lost to the country as with two exceptions the mills have subsided into a state of lethargy." *Paper Mills Directory*, 1878. "The Paper Trade in Ireland, not having sufficient vitality to have shown the least evidence of any healthy expansion in a time of prosperity has in more adverse times . . . nearly died out."

Shown here and overleaf are examples of eighteenth-century wallpaper designs after Ada K. Longfield, M.A., LL.B., in *The Journal of The Royal Society of Antiquaries of Ireland,* vol. LXXVII, Part II. Reproduction by kind permission.

e. Thanks to the dampness of summer and our mild short winter, they mature ten years lier than in Norway. By 1960, our first ntations will be due for felling. The thud the axe will once more resound in valleys t for long have heard nothing more promis- than the tap-tap of the cobbler leprechaun. lowing the crash of falling trees, saws will n merrily, power-driven from hydroplants Shannon (1925), on the Liffey (1942), on Erne (1950), and on the Lee (1953). Steps eady taken will ensure for us a reliable ply of animal sizes, glue, and chemicals. have the country's needs of paper produced home from native materials, that is our pe—our dream.

A fond dream maybe! Though the policy of ional self-sufficiency be popular with us here l now, we realize that in altered circum- nces it may be wise to change it. Already perts argue, what with Marshall Aid and nomic integration of continents, Ireland's e should be that of vegetable garden to rope. If it is shown that this be the best y out, we shall put away our "fond dream" l be content to get cheap paper from Scandi- via or Newfoundland. And as we ply the e among the cabbage rows we shall feel no rtbreak. Closely in touch with the clay we always have been, and though for the moment our industrial ambitions are real enough they are not fundamental.

BLARNEY

A more dreaded eventuality and a more imminent one is the disposing of our country exclusively to the production of shillelaghs, harps that once, mother machrees, lullabies, and tall stories for the much-lauded purpose of coaxing dollars from our sentimental American cousins. The diverting of too great a portion of our resources toward frumpery cannot but adversely affect the building up of sound, lasting industry. The Ireland of the future will not be greatly indebted to the quick-profit men of today, be they Irish, Scotch, Jewish, Indian, or plain phoney. The paper industry as it stands remains undercapitalized, while residents here hold £400,000,000 worth of foreign investments—the largest sum per capita of any nation.

We pin our hopes on our growing plantations, on our hydroelectric schemes, on the light Wicklow waters we always have with us. We will make paper yet, efficiently, cheaply, keeping well-abreast with world progress. We will do that and still make better songs than we ever had before. And, of course, we will cleave to our "jockeys and running cattle."

Statistics Concerning Paper Production in Ireland for 1948, Imports of Paper, Paper Products, and Papermaking Materials for 1949, and Imports and Exports of Printed Material for 1949

Extracted from *The Statistical Bulletin*

Gross Output, 1948

	Tons	£
Writing paper (large sheets)	1,759	187,210
Bag papers	4,502	260,040
Packing and wrapping (unglazed)	3,734	160,353
Wrapping (glazed)	2,738	142,123
Other sorts (incl. wall and ceiling)	—	449,140
Manuscript, book	538	71,214
Other stationery (incl. envelopes, note-paper, pads)	1,072	167,673
Paper bags	6,163	518,324
Strawboard	272	10,752
Ticket and carton board	192	11,166
Boxes, cartons, cardboard	8,473	1,031,070
Egg-box fillers and flats	—	196,140
Other products	—	103,473
Work in progress	—	80,286
Total Value of Goods Made		3,388,964

Materials Used

	Tons	£
Wood pulp	14,278	459,928
Cardboard, etc.	9,733	489,716
Paper (purchased as such)	5,805	406,267
Waste paper	8,405	91,833
Chemicals	1,732	36,268
Other materials	—	226,832
Work in progress	—	72,361
Total Cost of Materials		1,783,205

Extracted from *Trade Statistics*

Imports, 1949

	Cwts.	£
Papermaking materials	226,660	282
Paper:		
Printing, coated	20,633	84
Printing, not coated: news	420,112	814
Printing, not coated: other	46,822	152
Writing, in large sheets	19,804	73
Packing and wrapping	5,957	21
Tissue	4,054	25
Oiled, waxed, and other waterproof	5,303	41
Cigarette	4,108	52
Greaseproof	11,517	39
Imitation parchment	11,734	52
Gummed	3,823	29
Wall and ceiling paper, printed	3,913	31
Cellulose wrapping, etc., transparent, in sheets and rolls	8,690	147
Other paper	16,538	80
Stationery:		
Envelopes, notepaper, and writing pads	7,373	78
Manuscript books (except ruled music books)	2,114	34
Labels, tags, and printed tickets	2,213	51
Commercial	5,570	72
Other stationery made from paper	786	17
Cards (excl. playing cards and post cards)	1,903	59
Containers, empty, of cardboard, etc., and parts	—	226
Strawboard, not worked, not corrugated	92,008	100
Other cardboard, etc., in the piece	215,352	520
Other manufactures of paper	—	274
Total		3,365

PRINTED MATERIAL

Imports, 1949

	£
Newspapers	134,091
Periodicals	289,858
Books, etc.	406,529
Total	830,478

Exports, 1949

Newspapers	109
Books, etc.	129
Total	238
Balance inward	591

SOME NOTABLE DUBLIN PAPER MILLS

PROPRIETOR	LOCALITY	REMARKS
homas Slater	Rathfarnham	Built a second and up-to-date mill in 1737; made flock papers and stucco; founded a society journal; in 1800 gave up the papermaking business.
oses Verney	Whitechurch	Opened 1760; made gold and silver paper for the purpose of "preserving gold and silver lace from tarnishing."
cDaniel	Tallaght	Specialized in purple-blue papers, 1757. Name later spelled McDonnell.
hn McDonnell & Co.	Swift Brook	Bought a flour mill in 1785 and converted it for papermaking; justly famed for good quality of blue-laid and cream-laid writings. Had two 72-in. machines but only one in use—1889-1930; produced imitation vellum from mixture of esparto grass and linen rags; sold to Drury and Co. in the 1880's; still going strong; advertises "All-rag, tub-sized, loft-dried writings," and "handmadelike accountbook papers." Output 50 tons a week.
hristopher McDonnell	Killeen	Handmade writings and printings; bank-notes; closed, 1883; reopened 1907 to make wrappings and paper bags; one 60-in. machine.
cDonnell & Co.	Old Bawn	One 72-in. machine; closed down, 1877.
. Sullivan	Golden Bridge	Mentioned in *Fenn's Journal*, 1786; introduced first Fourdrinier in 1805; vatmen on strike for three years; produced 826 tons, 1826; made paper from straw by patent process purchased from French inventor, 1854; hoped to make 10,000,000 tons in ten years; vain hope; sold to Ryan & Co., 1872; closed, 1883.
eary & Son	Clondalkin	Two 63-in. machines; sold to Thomas Fegan, 1869; writings and coloured papers; closed down, 1875. Rebuilt and reopened, 1933, by "Clondalkin Paper Mills Ltd.," M.G. and unglazed imitation kraft and sulphite wrappings, M/F and S/C printings; 108- and 120-in. machines; 250 tons a week.
an Sullivan	Drimnagh	Printings and news; 60-in. machine in 1863; sold, 1883; reopened, 1899; acquired by Kynock Ltd., 1901; now branch of Bibby and Baron, Ltd., Bury, Lancashire; wrapping papers and coloured specialties; one 75-in. machine; 40 tons a week.
rown	Rock Brook	Closed, 1861.
aulkner	Kilmainham	Closed, 1899.

MILLS IN OTHER PARTS OF IRELAND

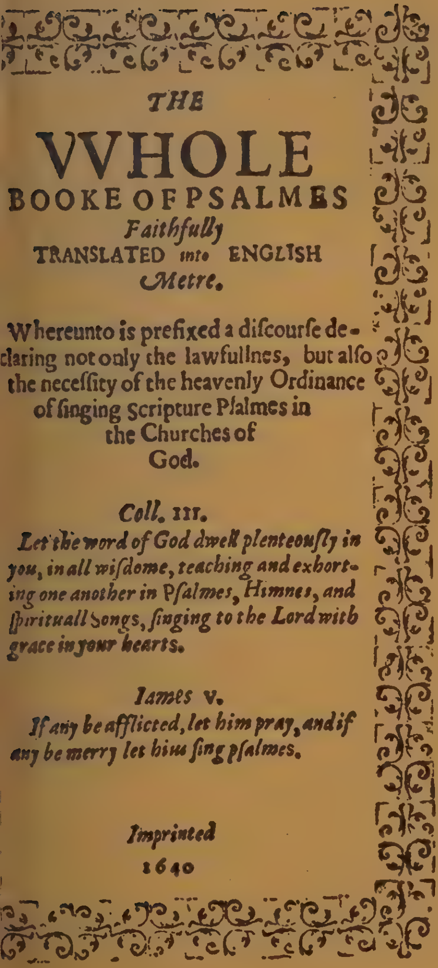
seph Sexton	Limerick	Erected "a double-mill," 1749; sought permission to export paper to "old Spain and the American Dominions"; not granted; during the year 1750 he made only 3,020 reams though he could produce more than 30 a day.
ros. Bagwell	Cork	50,000 reams per annum, 1763.
ros. Neale	Cork	Employed 50 hands, 1768.
om. Burke	Galway	"Waters . . . so light as to be absolutely purgative to strangers, and therefore the finest in the world for papermaking." *Fenn's Journal*, August 12, 1786.
. Greenfield	Antrim	Ballyclare mill mentioned in *Piggot's Directory*, 1824; excelled in cream-laid writings for school-copies; still holding out; five machines, 75-, 85-, 95-, and two 102-in.; M/F and S/C writings and printings, cartridges, glazed sulphites and coatings, manifolds, and G. I. P.

WILLIAM H. BECKWITH

TO WILLIAM H. BECKWITH—for his successful achievements in forty-seven years of association with the paperboard and paper-box industry, he having entered the field in 1903, upon finishing school, by taking employment with a small fabricator of paper boxes in the city so commonly known as the center of the furniture-manufacturing industry of the United States—a company that grew substantially, and which ultimately established a new corporate structure and built its own paper mill, thereupon the paper-box activity of the enterprise becoming a division of the expanded operations—and remaining with this firm until 1915, at which time he was assistant to the manager; for his desire for increased responsibility that caused him, at that time, to take an active part in organizing a firm which erected and placed in operation a combined paperboard mill and folding-paper-box plant within 75 miles of Chicago—having been active, as vice president and general manager, with his associates during the succeeding thirty-five years in the development of this company—a firm now producing about 160 tons of paperboard daily and using most of its entire tonnage in its own paper-box plant operations; for his other business interests that include a directorship in the company through which he first associated himself with the industry and a directorship in a Pacific Coast pulp and papermaking organization; for his overall participation in the affairs of the paperboard industry as evidenced by his service for several years as vice president and director of the National Paperboard Association; and particularly for his work in the industry during World War II when, as chairman of the committee that handled the national campaign for the conservation of waste paper, his leadership resulted in the acquiring of the added volume of fibrous material so desperately needed to produce the required paperboard and boxes for the war effort—the situation being so grave that for many months paper was considered as this country's No. 1 critical war material—hard worker, good listener, kind, cooperative, always willing to lend a hand.

THEODORE W. DUNN

TO THEODORE W. DUNN—for his more than sixty years of association with the pulp and paper-manufacturing business—he having followed in the footsteps of his father and grandfather, entering he industry in 1888, when only sixteen years old, and, having made his niche, steadfastly maintaining t down to the present day—starting as a laborer in a Mitscherlich pulp mill in the Wolverine State— mill which only two years later installed a Fourdrinier machine and changed over one of its two ulp-drying machines to a cylinder papermaking machine and began producing paper (this installaion and change-over being followed later by the installation of a second cylinder machine to give the ntegrated operations a papermaking capacity sufficient to utilize all of the pulp produced by the pulp ill)—and advancing quickly to timekeeper, shipping clerk, and pulp-drying-machine operator; for is active prosecution of a rebuilding program in 1903 which was necessitated by a serious fire that estroyed all of the mill (except the digesters and they were so badly damaged that they, too, had to e rebuilt), but which was again in production before the end of the year; for his further progress and ontinued aggressiveness that found him vice president and plant manager, also a member of the oard of Directors, when he left this organization in 1922 and two years afterward, in 1924, started a apermaking firm to manufacture lightweight bleached M.G. specialty papers—an enterprise on hich, since that time, he has concentrated his efforts, starting operations with one paper machine on ctober 9, 1924 (a second machine being installed in 1927), this mill, located in the Wolverine State, oday having a capacity of 40 tons daily; and for his urge to know, joined with the human attribute f sociability mixed with quietness and unobtrusiveness, that caused him to seek membership in both APPI and the Superintendents Association during the very early days of their respective existences— career so typically American that its rays spread out in all directions as do the rays of the lighthouse hat adorns his company's letterhead and gives to it a distinguished mark of identification.



THE

VVHOLE

BOOKE OF PSALMES

Faithfully

TRANSLATED *into* ENGLISH

Metre.

Whereunto is prefixed a diſcourſe declaring not only the lawfullnes, but alſo the neceſſity of the heavenly Ordinance of ſinging Scripture Pſalmes in the Churches of God.

Coll. III.

Let the word of God dwell plenteouſly in you, in all wiſdome, teaching and exhorting one another in Pſalmes, Himnes, and ſpirituall Songs, ſinging to the Lord with grace in your hearts.

James V.

If any be afflicted, let him pray, and if any be merry let him ſing pſalmes.

Imprinted

1640

The title page of the Yale copy of the *Bay Psalm Book.* This book sold at the Parke-Bernet galleries in New York, in 1947, for $151,000—the highest price ever paid at auction for a printed book. In September of 1947, it came to Yale.

FRANK SULLIVAN was born in Denver, Colora in 1912. After the usual number of experien which he found fascinating but others conside routine, he was graduated from Regis College of t same city.

He went to Saint Louis University in 1934 as a fell in English, having been trained in chemistry, physi and mathematics, for reasons which even he consid obscure but which he believes probably stemmed from the Great Depressio something equally significant.

Withdrawing to New Haven for two years, he was granted a doctorat philosophy from Yale University for work done on Middleton's *Witch*, afterwa returning to Saint Louis University. Here Dr. Sullivan advanced to the rank associate professor, and one year was given the St. Louis' Junior Chamber Commerce award for the most distinguished citizen.

In 1946 he went to Loyola University of Los Angeles, where he is now profes of English.

For three years he was literary editor of the *Los Angeles Tidings;* for ten ye he has been associate editor of the General Section of the *Annual Bibliography* the Modern Language Association. His only book was done in collaboration w his wife: *Moreana: a Checklist of Material by and about Saint Thomas More.*

His chief diversion is working on the books and manuscripts in the Huntingt Library, where his days away from teaching are usually spent.

Dr. Sullivan tells us he is much given to the oratorical flourish and wide gestu so that he is in some demand as a speaker, a fact that he finds gratifying if occasio ally wearing. To the best of his knowledge, he has not been neutral about anythi for more than ten per cent of his life—a circumstance that divides his acquai anceship into three equal parts: friends, enemies, and those who let him alone. his mind, this is an extremely satisfactory distribution.

The MOST EXPENSIVE PAPER *in* AMERICA

The Story Of Old Scrap Paper Now Worth Two Million Dollars A Ream

By Frank Sullivan

PAPER certainly came to this country with our earliest colonists. They were a literate, articulate, historically-minded lot, and whatever other necessities of e they may have left behind, paper they certainly ught with them.

Vhether it was to scribble the gossip ("M. M. ecuted today at Boston for murthering her child") to itemize the budget ("The Smith of Cambridge e bushel of Rie for laying Coulter and share") or compose their theological convictions into argu-nt and exposition—paper they needed, and paper y had.

To get to know this very early colonial paper—se scraps and fragments of private stock—in ms of how much, and what kind, and from whose ll, would lead a researcher through shouting ntroversies of conscience, and commerce, and omwell, and the King; and then across the quiet d forgotten details of social history, domesticity, icity, and rank misfortune. It would be a reward-g trip if one could follow the bundles of writing per stuffed in with the colonists' baggage, but the d is ill marked and the journey would, at best, very slow indeed.

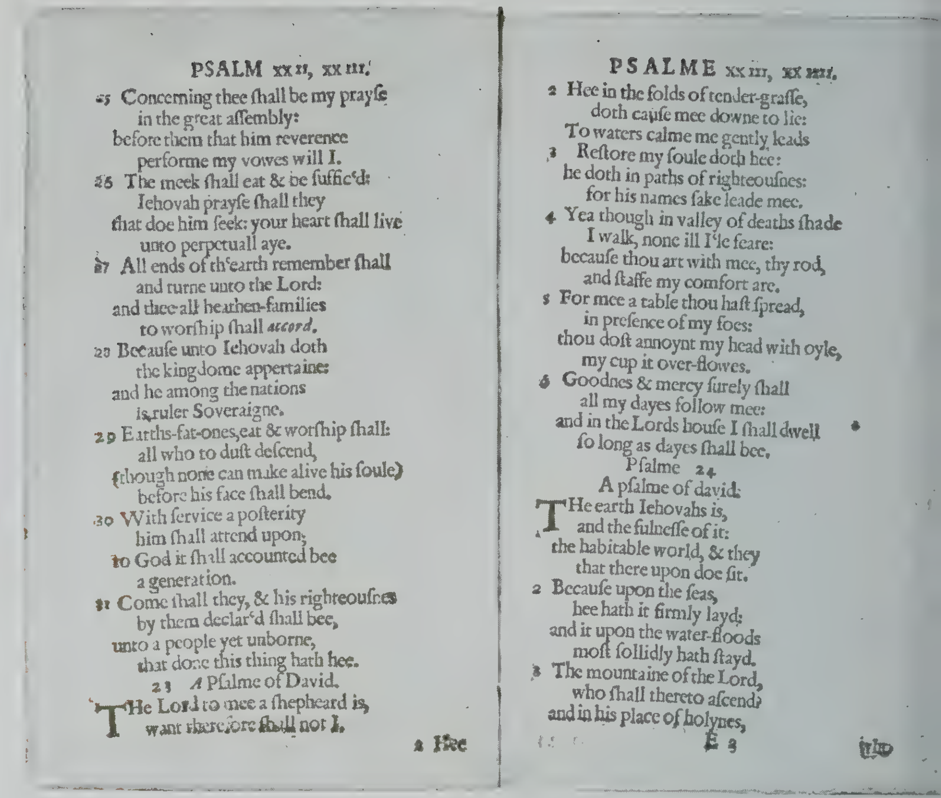
But the first *quantity* shipment of paper, the paper d for the first printing in New England, leaves a trail clear enough to follow with fair confidence and more than a little interest.

START OF THE TRAIL

In the summer of 1638, the Reverend Joss Glover, late rector of the church at Sutton, Surrey, loaded onto the ship *John of London:* his family, his servants, his smelting equipment, his printing press, and £60 worth of paper.

He was bound for the land of promise because his chosen career in England under Archbishop Laud no longer seemed promising. He had left his church because he would not read from the pulpit, as directed, the King's *Declaration Concerning Lawfull Sports*—a royal permission for Sunday dancing, leaping, vaulting, and the setting up of Maypoles. The parish register notes that he "was beloved of the most, if not all, and his departure was lamented of the most, if not all," but even a beloved, lamented, and determined minister needed, in the New England of 1638, some extra-ecclesiastical activities to combat some of the worst financial difficulties the area has ever suffered. And Mr. Glover, among his other plans, planned to print and publish so that his cupboard would not be empty.

To this end, he purchased a press, probably put a printer under contract, and bought his £60 worth



PSALM xxii, xxiii.

25 Concerning thee ſhall be my prayſe
in the great aſſembly:
before them that him reverence
performe my vowes will I.
26 The meek ſhall eat & be ſuffic'd:
Iehovah prayſe ſhall they
that doe him ſeek: your heart ſhall live
unto perpetuall aye.
27 All ends of th'earth remember ſhall
and turne unto the Lord:
and thee all heathen-families
to worſhip ſhall *accord.*
28 Becauſe unto Iehovah doth
the kingdome appertaine:
and he among the nations
is ruler Soveraigne.
29 Earths-fat-ones, eat & worſhip ſhall:
all who to duſt deſcend,
(though none can make alive his ſoule)
before his face ſhall bend.
30 With ſervice a poſterity
him ſhall attend upon;
to God it ſhall accounted bee
a generation.
31 Come ſhall they, & his righteouſnes
by them declar'd ſhall bee,
unto a people yet unborne,
that done this thing hath hee.
23 *A* Pſalme of David.
THe Lord to mee a ſhepheard is,
want therefore ſhall not I.
2 Hee

PSALME xxiii, xxiiii.
2 Hee in the folds of tender-graſſe,
doth cauſe mee downe to lie:
To waters calme me gently leads
3 Reſtore my ſoule doth hee:
he doth in paths of righteouſnes:
for his names ſake leade mee.
4 Yea though in valley of deaths ſhade
I walk, none ill I'le feare:
becauſe thou art with mee, thy rod,
and ſtaffe my comfort are.
5 For mee a table thou haſt ſpread,
in preſence of my foes:
thou doſt annoynt my head with oyle,
my cup it over-flowes.
6 Goodnes & mercy ſurely ſhall
all my dayes follow mee:
and in the Lords houſe I ſhall dwell
ſo long as dayes ſhall bee.
Pſalme 24
A pſalme of david.
THe earth Iehovahs is,
and the fulneſſe of it:
the habitable world, & they
that there upon doe ſit.
2 Becauſe upon the ſeas,
hee hath it firmly layd:
and it upon the water-floods
moſt ſollidly hath ſtayd.
3 The mountaine of the Lord,
who ſhall thereto aſcend?
and in his place of holynes,
E 3 who

An opening in the *Bay Psalm Book* to the well-known 23rd Psalm. A comparison with the King James version of this text will reveal not only the Bay Book's stylistic deficiencies, but also some of the charm of poetry written by men who wrote: "If the Verses are not always so elegant, as some desire . . . let them consider that God's Altar needs not our pollishings."

of paper—in which purchase (it grieves me to relate) he was cozened and hoaxed and swindled and cheated by a rascal who was (I am happy to avow) almost certainly neither a manufacturer of paper nor a jobber of this commodity.

CAVEAT EMPTOR

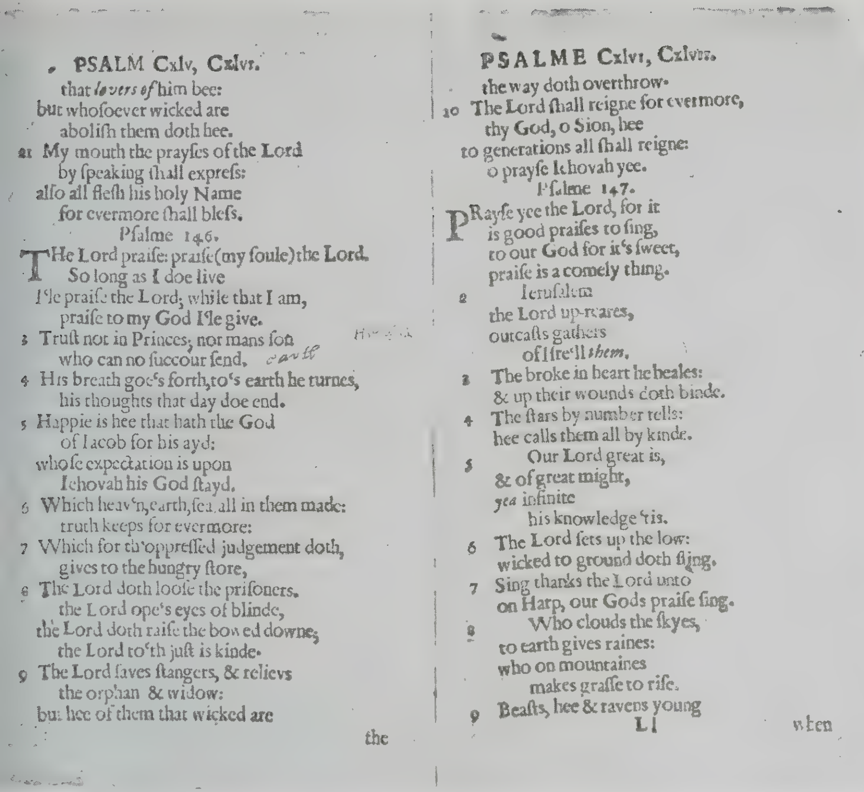
Here was Mr. Glover: an amateur, more or less in trouble with "the powers," embarking for a distant land—and probably trying to save some money. Here was Mr. Glover: the perfect victim for sharp practice. And in an age when practice was never really dull, it is not startling to find that some waste-paper collector dressed up, what I am convinced was, 240 reams of broken and rejected sheets of varying sizes from various mills—and sold it "at a bargain."

In my considered opinion I have never seen worse seventeenth-century book paper than Mr. Glover's stock. It has, of course, a rag-fiber feel that tells your fingers that your eyes are wrong to compare it with twentieth-century newsprint, but the comparison never quite leaves your mind. Sixty years ago, William Matthews, a New York bookbinder, wrote that some of it was so "tender as scarce to stand the knife," and that it was almost impossible to mat
or to patch.

However, the state of the paper today is not to
attributed exclusively to too much bleach in t
beater, or not enough vim in the vatman. F
copies of the most valuable of the books on Glo
paper were carefully deposited in the tower of C
South Church, Boston, where the summer sun ca
down most strongly on them and where the artific
heat of winter would be chimneyed up past the
Books had a hard time of it in the Colonies, t
Confederation, and the early United States: th
were wasted with the troubles of careless handlin
and worn with the tribute of careful reading.

RETURN TO THE TRAIL

On Mr. Glover's paper, and at the press
shipped to Massachusetts, was printed the fi
book in what is now the United States. It was
a book of the psalms newly translated to satis
these Puritans of the Bay Colony who, Cott
Mather tells us, beheld in other translations "
many detractions from, Additions to, and Var
tions of, not only the Text, but the very sense of t
Psalmist, that it was an Offence unto them." Su



PSALM Cxlv, Cxlvi.
that *lovers of* him bee:
but whoſoever wicked are
abolish them doth hee.
21 My mouth the prayſes of the Lord
by ſpeaking ſhall expreſs:
alſo all fleſh his holy Name
for evermore ſhall bleſs.
Pſalme 146.
THe Lord praiſe: praiſe (my ſoule) the Lord.
So long as I doe live
I‘le praiſe the Lord, while that I am,
praiſe to my God I‘le give.
3 Truſt not in Princes, nor mans ſon
who can no ſuccour ſend. earth
4 His breath goe‘s forth, to‘s earth he turnes,
his thoughts that day doe end.
5 Happie is hee that hath the God
of Iacob for his ayd:
whoſe expectation is upon
Iehovah his God ſtayd.
6 Which heav‘n, earth, ſea, all in them made:
truth keeps for evermore:
7 Which for th‘oppreſſed judgement doth,
gives to the hungry ſtore,
8 The Lord doth looſe the priſoners.
the Lord ope‘s eyes of blinde,
the Lord doth raiſe the bowed downe;
the Lord to‘th juſt is kinde.
9 The Lord ſaves ſtangers, & relievs
the orphan & widow:
but hee of them that wicked are
the

PSALME Cxlvi, Cxlvii.
the way doth overthrow.
10 The Lord ſhall reigne for evermore,
thy God, o Sion, hee
to generations all ſhall reigne:
o prayſe Iehovah yee.
Pſalme 147.
PRayſe yee the Lord, for it
is good praiſes to ſing,
to our God for it‘s ſweet,
praiſe is a comely thing.
2 Ieruſalem
the Lord up-reares,
outcaſts gathers
of Iſre‘ll *them*.
3 The broke in heart he heales:
& up their wounds doth binde.
4 The ſtars by number tells:
hee calls them all by kinde.
5 Our Lord great is,
& of great might,
yea infinite
his knowledge ‘tis.
6 The Lord ſets up the low:
wicked to ground doth fling.
7 Sing thanks the Lord unto
on Harp, our Gods praiſe ſing.
8 Who clouds the ſkyes,
to earth gives raines:
who on mountaines
makes graſſe to riſe.
9 Beaſts, hee & ravens young
Ll when

An opening in the *Bay Psalm Book* showing the disintegration and discoloration of the paper. Note the variant spelling of *psalm* in the headlines on left- and right-hand pages and the note written in a seventeenth-century hand ("earth the lord") above the fourth verse of *Psalme* 146. The type font used had no apostrophe; note the inverted commas used to supply this deficiency.

ok on even the best paper would have been worn —on Mr. Glover's paper it has almost worn npletely away.

he *Whole Booke of Psalmes Faithfully Translated English Metre* was done at Cambridge in 1640, bably by Matthew Day. Matthew's father, ven Day, is usually named the first printer. This -up of Days is the result of what one enraged liographer calls a historical mistake comparable orgetting Paul Revere and celebrating his horse, , obviously, this is another story.

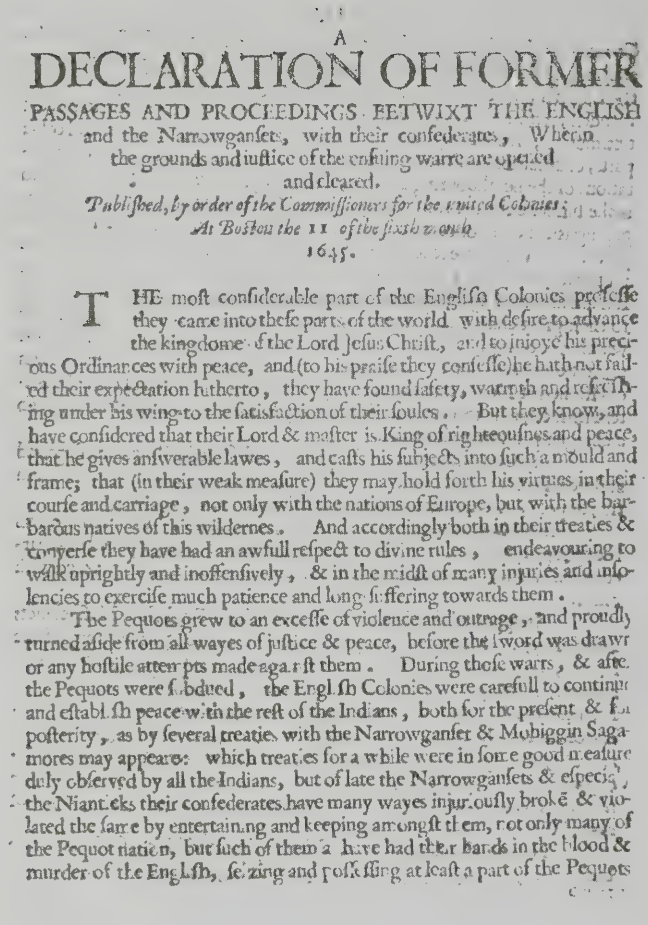
owever, since there is no Paul Revere to tell us ich way Mr. Glover's paper went, we have no ice but to rely on Steven Day and Samuel Green. ther Green, as he signs himself, took over the ss after Matthew Day departed this life, leaving er him an ink horn, a looking glass, three spoons, an unhemmed table cloth, but no record of the ss he tended or the paper he used. And Mr. ver himself, as Governor Winthrop tells us, died sea hitherward" to Massachusetts.

he widowed Mrs. Glover sold £6 worth of er before she married Henry Dunster, first sident of Harvard, who, after his marriage, took rge of all the Glover estate.

In 1654, President Dunster found his opinions on infant Baptism at variance with the opinions held, not only by most of his neighbors, but also by the most influential among them. He resigned the presidency of the college, to which he left the press, packed his other belongings including twelve reams of paper, and eventually moved away to another, and more sympathetic, pastorate.

About this time, while troubled by academic, theological, and (we may presume) financial difficulties, and with an indictment hanging over his head for disturbing the peace, Dunster's stepson-in-law, John Appleton of Ipswich, added to the general unhappiness by demanding an account of Dunster's stewardship of the Glover property—with special reference to the unpaid dowry of his wife, Priscilla Glover Appleton.

Steven Day and Samuel Green were witnesses against Dunster and from their depositions and the notes they used to work up their testimony, I think all of Mr. Glover's paper can be accounted for within the limits of an informed and partially verified conjecture. Green and Day used too many round numbers to inspire complete confidence in all their figures, but, despite the fact that both probably



A

DECLARATION OF FORMER
PASSAGES AND PROCEEDINGS BETWIXT THE ENGLISH
and the Narrowganſets, with their confederates, Wherein
the grounds and iuſtice of the enſuing warre are opened
and cleared.
Publiſhed, by order of the Commiſſioners for the united Colonies;
At Boſton the 11 *of the ſixth month*
1645.

THE moſt conſiderable part of the Engliſh Colonies profeſſe they came into theſe parts of the world with deſire to advance the kingdome of the Lord Jeſus Chriſt, and to injoye his precious Ordinances with peace, and (to his praiſe they confeſſe) he hath not failed their expectation hitherto, they have found ſafety, warmth and refreſhing under his wing to the ſatisfaction of their ſoules. But they know, and have conſidered that their Lord & maſter is King of righteouſnes and peace, that he gives anſwerable lawes, and caſts his ſubjects into ſuch a mould and frame; that (in their weak meaſure) they may hold forth his virtues in their courſe and carriage, not only with the nations of Europe, but with the barbarous natives of this wildernes. And accordingly both in their treaties & converſe they have had an awfull reſpect to divine rules, endeavouring to walk uprightly and inoffenſively, & in the midſt of many injuries and inſolencies to exerciſe much patience and long ſuffering towards them.

The Pequots grew to an exceſſe of violence and outrage, and proudly turned aſide from all wayes of juſtice & peace, before the ſword was drawn or any hoſtile attempts made against them. During thoſe warrs, & after the Pequots were ſubdued, the Engliſh Colonies were carefull to continue and eſtabliſh peace with the reſt of the Indians, both for the preſent & for poſterity, as by ſeveral treaties with the Narrowganſet & Mohiggin Sagamores may appeare: which treaties for a while were in ſome good meaſure duly obſerved by all the Indians, but of late the Narrowganſets & eſpecially the Nianticks their confederates have many wayes injuriouſly brokē & violated the ſame by entertaining and keeping amongſt them, not only many of the Pequot nation, but ſuch of them as have had their hands in the blood & murder of the Engliſh, ſeizing and poſſeſſing at leaſt a part of the Pequots

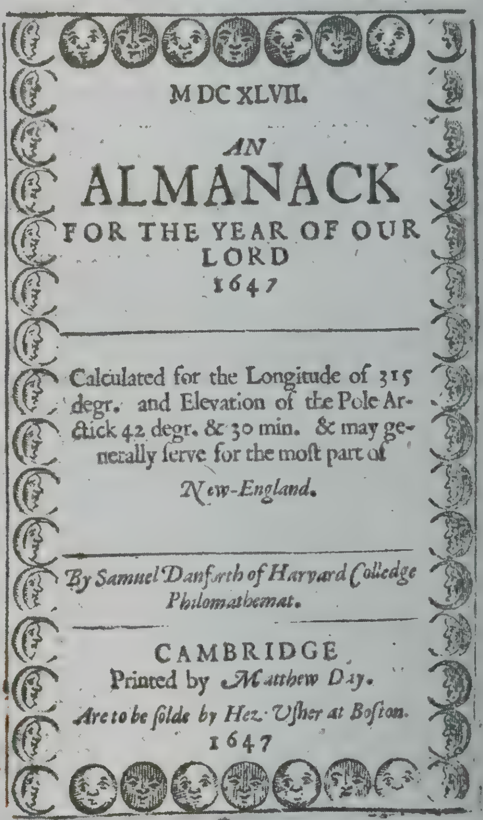
The first page and title page of a book known today in only four copies. The work was printed to explain to missionary-minded people in England why the New Englanders were killing Indians. The catch word in the lower right-hand corner (Country) has almost worn off the paper. The "united Colonies" mentioned in the seventh line of the title (Massachusetts, Plymouth, New Haven, and Hartford) are the earliest ancestors of the United States.

had an ax to grind, the outline of an inventory is given here:

Day testified that Glover paid £60 for paper in England. Since Day signed with Glover as a locksmith, it seems unlikely that he would have had much to do with paper in England. He probably got the figure from Mrs. Glover, who, in the grief of her recent widowhood and the confusion induced by a strange land, gave him some sort of charge of the print shop.

Later in his notes, Day sets a price of 5s. a rea
on the paper. I cannot see any way this figure cou
have been arrived at except by counting the rea
he found in the shipment and dividing them into t
£60 he was told they cost. From which hypothes
I begin with 240 reams of paper delivered to Ca
bridge in 1638, and try to account for their u
pausing to remark here that these reams must ha
each contained at least 500 sheets of paper, si
Day allows only "21. Rheam of papr" for the *L*
Book of 1648—printed on 17 sheets, and published
an edition of 600 copies.

This price of 5s. a ream for paper in New Engla
is disproportionately low. Before the Colon



M DC XLVII.

AN
ALMANACK
FOR THE YEAR OF OUR
LORD
1647

Calculated for the Longitude of 315 degr. and Elevation of the Pole Arctick 42 degr. & 30 min. & may generally ſerve for the moſt part of *New-England.*

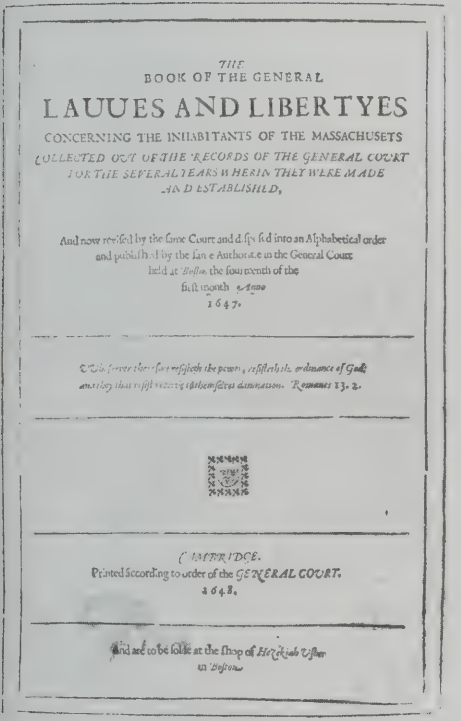
By Samuel Danforth of Harvard Colledge Philomathemat.

CAMBRIDGE
Printed by *Matthew Day.*
Are to be ſolde by Hez. Uſher at Boſton.
1647

The only known copy of the only book bearing the nan
of the first printer in what is now the United State
Although the given latitude and longitude would tod
locate New England in the Soviet Republic of Georgi
Captain John Smith's map, published 1616, locates t
mouth of the Charles River at the given point of referenc

gan to make their own paper, at least half the w England price went for transportation. In 0, the London directors of the Corporation for w England voted payment to "Mr. John Cade 104 reams of fine piller paper after the rate of 5s. per ream. . ." (which is a little more than £28), l for "packing &c. ye sume of 21 li. 14s. 4d.", to ich, presumably, freight rates were still to be led.

Jsing similar proportions, Mr. Glover's paper ist have been sold very cheaply indeed in the glish market, though 5 shillings was a respect- le sum of money in the Bay Colony where it would buy three loads of wood, where a bushel of rye cost 3 pence, and where (in 1660) Marmaduke Johnson, a printer, agreed to go and work at his trade seventy-two hours a week for £40 a year, plus room and board and laundry.


THE
BOOK OF THE GENERAL
LAUUES AND LIBERTYES
CONCERNING THE INHABITANTS OF THE MASSACHUSETS
COLLECTED OUT OF THE RECORDS OF THE GENERAL COURT
FOR THE SEVERAL YEARS WHERIN THEY WERE MADE
AND ESTABLISHED,

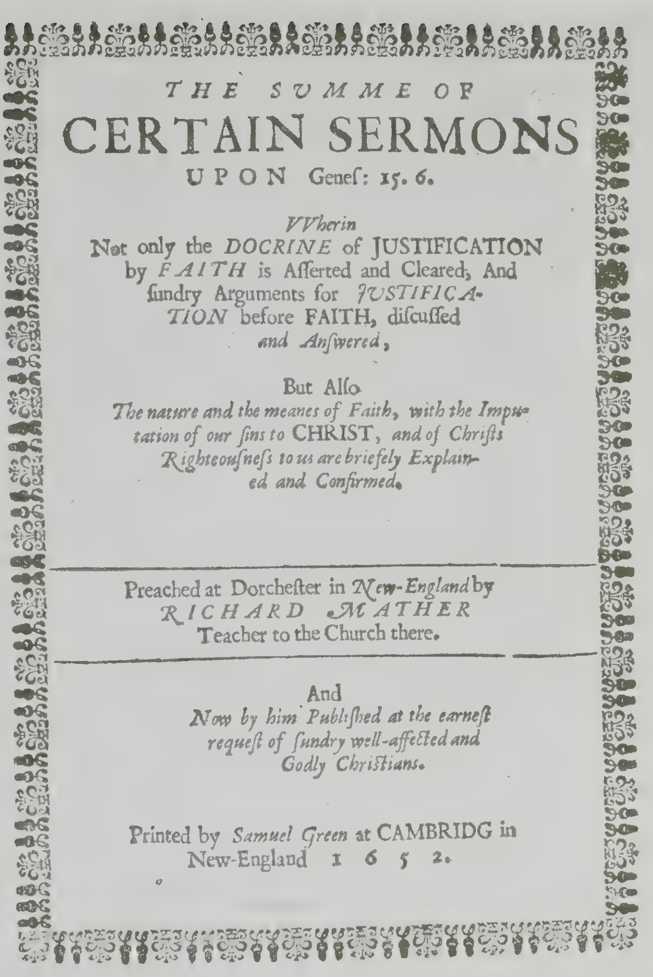
And now reviſed by the ſame Court and diſpoſed into an Alphabetical order
and publiſhed by the ſame Authoritie in the General Court
held at *Boſton* the fourteenth of the
firſt month *Anno*
1647.

Whoſoever therefore reſiſteth the power, reſiſteth the ordinance of God: and they that reſiſt receive to themſelves damnation. Romanes 13. 2.

CAMBRIDGE.
Printed according to order of the *GENERAL COURT.*
1648.

And are to be ſolde at the ſhop of *Hezekiah Uſher*
in *Boſton.*

e only copy known of this book is in the Huntington rary. It was found in 1906 bound with other ma- ials in the library of the Mayor of Rye, England. Apart m other interest, this book is most significant because is the first attempt of people, in the tradition of the glish common law, to reduce their legislation into a comprehensive document.


THE SUMME OF
CERTAIN SERMONS
UPON Geneſ: 15. 6.

VVherin
Not only the *DOCRINE* of JUSTIFICATION
by *FAITH* is Aſſerted and Cleared; And
ſundry Arguments for *JUSTIFICA-*
TION before FAITH, diſcuſſed
and Anſwered,

But Alſo
The nature and the meanes of Faith, with the Impu-
tation of our ſins to CHRIST, *and of Chriſts*
Righteouſneſs to us are briefely Explain-
ed and Confirmed.

Preached at Dorcheſter in *New-England* by
RICHARD MATHER
Teacher to the Church there.

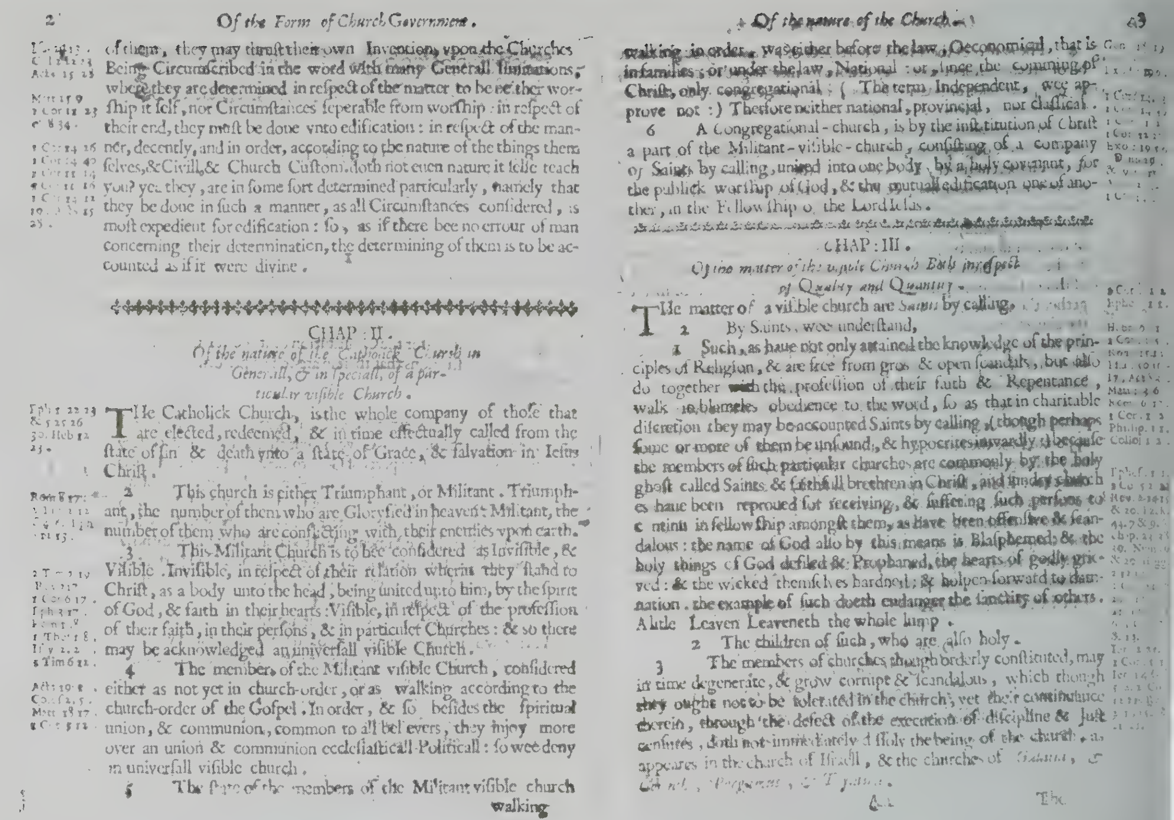
And
Now by him Publiſhed at the earneſt
requeſt of ſundry well-affected and
Godly Chriſtians.

Printed by *Samuel Green* at CAMBRIDG in
New-England 1 6 5 2.

One of three known copies. This book was written by the grandfather of Cotton Mather. The imprint carries the name of Samuel Green who took over the first American press after the death of Matthew Day, first American printer.

THE TRAIL CONTINUES

The Whole Booke of Psalmes, popularly called the *Bay Psalm Book*, originally sold for 20 pence. There were 1,700 copies of it—of which eleven still survive, three complete with the 37 original sheets. One of these 37-sheet books sold in New York, in



2 Of the Form of Church Government.

of them, they may thruſt their own Invention, upon the Churches Being Circumſcribed in the word with many Generall limitations; where they are determined in reſpect of the matter to be neither worſhip it ſelf, nor Circumſtances ſeperable from worſhip: in reſpect of their end, they muſt be done vnto edification: in reſpect of the manner, decently, and in order, according to the nature of the things themſelves, & Civill, & Church Cuſtom. doth not even nature it ſelfe teach you? yea they, are in ſome ſort determined particularly, namely that they be done in ſuch a manner, as all Circumſtances conſidered, is moſt expedient for edification: ſo, as if there bee no errour of man concerning their determination, the determining of them is to be accounted as if it were divine.

CHAP: II.

Of the nature of the Catholick Church in Generall, & in ſpeciall, of a particular viſible Church.

THe Catholick Church, is the whole company of thoſe that are elected, redeemed, & in time effectually called from the ſtate of ſin & death unto a ſtate of Grace, & ſalvation in Ieſus Chriſt.

2 This church is either Triumphant, or Militant. Triumphant, the number of them who are Gloryfied in heaven: Militant, the number of them who are conflicting with their enemies vpon earth.

3 This Militant Church is to bee conſidered as Inviſible, & Viſible. Inviſible, in reſpect of their relation wherin they ſtand to Chriſt, as a body unto the head, being united unto him, by the ſpirit of God, & faith in their hearts: Viſible, in reſpect of the profeſſion of their faith, in their perſons, & in particular Churches: & ſo there may be acknowledged an univerſall viſible Church.

4 The members of the Militant viſible Church, conſidered either as not yet in church-order, or as walking according to the church-order of the Goſpel. In order, & ſo beſides the ſpiritual union, & communion, common to all beleevers, they injoy more over an union & communion eccleſiaſticall-Politicall: ſo wee deny an univerſall viſible church.

5 The ſtate of the members of the Militant viſible church walking

walking

Of the nature of the Church. 3

walking in order, was either before the law, Oeconomical, that is in families; or under the law, National: or, ſince the comming of Chriſt, only congregational; (The term Independent, wee approve not:) Therefore neither national, provincial, nor claſſical.

6 A Congregational-church, is by the inſtitution of Chriſt a part of the Militant-viſible-church, conſiſting of a company of Saints by calling, united into one body, by a holy covenant, for the publick worſhip of God, & the mutuall edification one of another, in the Fellowſhip of the Lord Ieſus.

CHAP: III.

Of the matter of the viſible Church both in reſpect of Quality and Quantity.

THe matter of a viſible church are Saints by calling.

2 By Saints, wee underſtand,

1 Such, as have not only attained the knowledge of the principles of Religion, & are free from groſs & open ſcandals, but alſo do together with the profeſſion of their faith & Repentance, walk in blameles obedience to the word, ſo as that in charitable diſcretion they may be accounted Saints by calling, (though perhaps ſome or more of them be unſound, & hypocrites inwardly:) becauſe the members of ſuch particular churches are commonly by the holy ghoſt called Saints & faithfull brethren in Chriſt, and ſundry churches have been reproved for receiving, & ſuffering ſuch perſons to continue in fellowſhip amongſt them, as have been offenſive & ſcandalous: the name of God alſo by this means is Blaſphemed: & the holy things of God defiled & Prophaned, the hearts of godly grieved: & the wicked themſelves hardned: & holpen forward to damnation. the example of ſuch doeth endanger the ſanctity of others. A litle Leaven Leaveneth the whole lump.

2 The children of ſuch, who are alſo holy.

3 The members of churches though orderly conſtituted, may in time degenerate, & grow corrupt & ſcandalous, which though they ought not to be tolerated in the church, yet their continuance therein, through the defect of the execution of diſcipline & Juſt cenſures, doth not immediately diſſolve the being of the church, as appeares in the church of Iſraell, & the churches of Galatia, & Corinth, Pergamus, & Thyatira.

The

An opening in the *Platform of Church Discipline,* called the "Synod Book," with the print on the opposite sides of the pages coming through clearly enough to be read in a mirror. Notice above the beginning of Chapter II (left-hand page) the beginning of the first chapter, which, with the clearly visible initial E, reads: "Ecclesiastical Polity on Church Government, etc." This book is one of eight known copies.

1947, for $151,000.00 (without sales tax), which price can be reduced by arithmetical whimsey to something better than two million dollars a ream for this once five-shilling paper.

However, even the distraction of such a price cannot completely obscure the fact that this is not good paper. Wilberforce Eames, in comparing the copy now at the Henry E. Huntington Library with the copy now in the Lennox collection of the New York Public Library, discovered that the paper in the Huntington copy had shrunk 2½ per cent more than that in the Lennox copy, which itself may have shrunk no one knows how much.

The quarto leaves in today's existing Psalm Books are widest in the Lennox copy (4.75 inches) and tallest in the A-copy belonging to the Boston Public Library (7.25 inches). This would indicate a sheet at least 14.5 inches by 9.5 inches when it left the printe

Mr. Glover seems to have been given 240 reams seconds and scraps of various sizes and varyi quality. In the *Bay Psalm Book* there are at lea five different watermarks, all common devices: vas of three sizes, one or two handles, with and witho grapes. These same five watermarks are mixed wit eight others in other books from the Dunste Glover press.

In the Huntington Library's copy of the Psal different sheets carrying the same watermarks wi have that mark in different positions. Up and dow the leaf, the position of the mark varies 1.75 inche in and out it shifts .56 inch. Since this is too muc peregrination to attribute to normal trimming, suggest that a bundle was made up of various siz and types of paper; carelessly stacked, the wate mark fell sometimes to one side of the pile, som ies to the other. After this, a cut on one side of bundle of papers would put some watermarks ther from the center of the sheet and others closer it.

Continuing with the supposition of a scrap pile old and varied papers rejuvenated and made uni- m by the knife, it seems possible to explain other peculiarity of the Huntington copy of the lms. Some pages in this book have the lines of e square with the edge of the leaf but not with wire lines or chains. If some sheets of the pile re rotated slightly out of position before cuts re made, the margins, type lines, leaf edges, and rks of the mold would be as they are here, and hough other explanations are possible, I, as any d parent, admire (perhaps to excess) my own in child.

Nor is my scrap-pile theory exclusively dependent on variant watermarks in these papers; there is o a great variety in the spacing of the chains om 18 to 24 mm. apart), and the wire lines vary density, where they can be counted (in some ces the paper looks almost wove) from 22 to 28 the inch. And finally the lack of uniform thick- s of the sheets makes the sorry character of the per apparent even to careless fingers paging ough the Psalms; for example, going from the gathering to the Dd gathering the thickness of leaf increases from .09 mm. to .19 mm.

But no outpouring flood of unkind remarks con- ning this paper, as paper, obscures the fact that served the purpose for which it was intended. us see how it was used.

TRAIL'S END

Allowing 5 per cent for overrun, the Psalm Book uld have used up 133 reams of paper (37 sheets, 00 perfect copies, and 500 sheets to the ream). ven Day wrote that *The Capital Laws*, a spelling book, and "the declaracion of the Narroganset warre" were charged with £2 of paper, and Mr. Norris' *Catechism* with £1. These £3 account for 12 reams, at the usual price of 5s. a ream. He also states explicitly that the *Law Book* of 1648 took 21 reams of paper, and that five almanacs took a ream each. Total paper accounted for by Mr. Day, including that used in the Psalm Book, was 171 reams.

Samuel Green noted a total of £6 10s. allowed for paper used in Richard Mather's *Sermons*, in the *Synod Book of Church Discipline*, in a supplement to the *Law Book*, and in an Indian *Catechism*. He also stated that the total price for printing and paper on Mr. Davenport's *Catechism* was £6. Noting that Day charged one-fourth of the total expenditures on Mr. Norris' *Catechism* to paper, we may presume that Mr. Davenport's *Catechism* used one-fourth of £6 of paper or £1 10s. worth. Total of Mr. Green's charges for paper £8; total paper thus accounted for by Mr. Green, 32 reams.

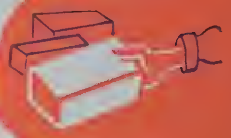
In court it was testified that Mrs. Glover sold £6 of paper (that is, 24 reams) before she married Dunster, and that Dunster carried away 12 reams of paper after he left Harvard.

Governor Winthrop tells us that the Glover press published an almanac by William Pierce, Mariner. This has now disappeared, but, at the rate allowed by Day for other almanacs, it would have taken another ream of paper.

From, therefore, the testimony of Mr. Day, 171 reams; from Mr. Green's testimony, 32 reams; sold by Mrs. Glover, 24 reams; carried off by Mr. Dunster, 12 reams; plus 1 ream for Pierce the Mariner, for his almanac—making a total of 240 reams of paper.

Two hundred and forty reams of paper I set myself, earlier in this paper, to trace. Here I arrive with exactly 240 reams accounted for and so conclude with satisfaction, and some surprise.

HERCULES developments



NEW IDEA IN DEFOAMERS

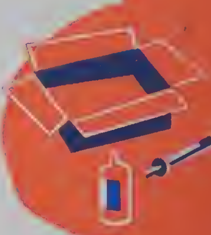
Now you can buy a defoamer in easy-to-handle, easy-to-use 2½-lb. bricks. This new, low-cost "Defoamer 4" eliminates waste, mess, and drums. One 2½-lb. brick, dissolved in water, makes 40 gallons of defoamer liquid. Send for free sample brick.

HOT LACQUER IS HOT NEWS

Wearing hot-lacquer coats, a group of new and old cars is providing Hercules with a mobile proving ground for the relatively new technique of spraying high-solids lacquers at elevated temperatures. Furniture manufacturers also are rapidly adopting the process.

Heat, rather than high-solvent content, makes the lacquer fluid enough for spraying. Less solvent and higher solids mean thicker films when dried, fewer coats required, increased production capacity, and minimum rubbing.

Write for folder, "The Case for the Hot-Lacquer Process."



THE CASE FOR CASEIN

Supreme among water adhesives because of their water resistance and dry bond strength, casein glues are finding added uses in the packaging industry. One of the oldest applications is for affixing beer bottle labels. The latest important use is for gluing the paperboard beer cases themselves. Here, a bond is provided which is strong enough to withstand handling and shipping, yet easily released when the case is opened. Hercules is a major supplier of casein to the adhesives industry.

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Hercules Vinsol® is a low-cost quality resin—currently 3¢-3.5¢ lb. Thermoplastic, dark-colored, high-melting, versatile "Vinsol" can be used to extend or modify many costlier resins and other materials—often with noticeable improvement in end-product performance. Known uses include asphalt emulsions, adhesives, plastics, protective coatings, printing inks.

NEW "HERCOFLEX" FOR VINYLS

"Hercoflex" 290 (octyl decyl adipate) is the third in a series of vinyl plasticizers to be announced within recent months by Hercules. Possessing the low volatility usually restricted to phthalates, this adipate-based ester contributes exceptional low-temperature properties and improved "drape" to vinyl film and sheeting.

"VINSOL" and "HERCOFLEX" are Hercules trademarks.

NATIONAL DOG WEEK
SEPTEMBER 24-30
Building Character Together

CONNECTICUT'S *first* PAPERMAKER

By Harrison Elliott

IT USED TO BE SAID that paper begins where many things end . . . in rags. This was true of practically all paper made in this country prior to the advent of wood as a basic raw material for papermaking. In the making of paper from rags there comes to mind a curious bit of papermaking of a rather odd material. The tale may be apocryphal, but it makes a likely story.

In 1866 a Connecticut papermaker, so tradition has it, was the recipient of a consignment of Egyptian mummies from which the linen swathing was to be removed and paper made from it. The problem of the disposal of the residual corpse was quickly solved by the ingenious and impatient Yankee papermaker who threw the entire parcel into the beater.

CHRISTOPHER LEFFINGWELL
Reproduced by permission from Mary E. Perkins'
Old Houses of the Ancient Town of Norwich, Connecticut.

Clay as a filler in papermaking is of comparatively modern usage. But here was a papermaker who pioneered in its use with an innovation probably better than he knew. The thought occurs that this might be a better disposition of human clay than that afforded by cremation which reduces it to useless ashes, a wasteful process, especially when one's ashes are cast to the four winds. This phase of the human element in papermaking, man serving as a filler, has possibilities.

But to go back to the beginning of papermaking in Connecticut, to something more authentic and documented: Connecticut's first papermaker was one Christopher Leffingwell (1734–1810) who at Norwich, on the Yantic River, near "No Man's Acre" erected the first paper mill in the state in 1766. The mill was quickly put into operation, and *The Connecticut Gazette* was printed on paper made in the Leffingwell mill in December, 1766.

Christopher Leffingwell was a man of much resource and enterprise and with many interests commercially. He was noted for his industry, integrity, and his zeal for the public welfare. Leffingwell had a genius for organization, from which the colony derived much benefit; the possessor of a business acumen which brought him success in his several business ventures.

The output of the Leffingwell mill consisted of various kinds of paper, such as printing, wrapping, cartridge, and sheathing papers, with an annual production of 1,300 reams. Ten to twelve hands were employed. A letter written in October, 1767, had this to say of the mill's efficiency:

> "The paper mill at Norwich is plentifully supplied with rags, and has full demand for its paper. Mr. Throop tells me that he had viewed it when at work; that it is a curiosity; that they mould and make ready for the Press about ten sheets per minute by the watch."[1]

While Leffingwell's venture in papermaking was ostensibly to meet a pressing economic need, it was not a financial success at the start, and sought government aid on the grounds that it was a public necessity of much importance to the welfare of the Colony. In May, 1769, the General Assembly of the Colony granted Leffingwell an annual bounty of "two pence the quire on all good writing paper, and one penny the quire on all printing and coarser paper" that he produced. But in 1772 the Assembly resolved "that the payment of said bounty be discontinued for the future, and the grant is hereby repealed."

In 1775 an edition of *The Connecticut Gazette*, with its account of the battle of Lexington and Concord, was printed on Leffingwell paper.

Other commercial ventures of Leffingwell's were a chocolate mill and a fulling mill vith dye house attached which began operating in 1770. He was the foremost citizen n Norwich, and for his patriotic services and devotion to the cause of the War of the merican Revolution he was made a colonel in command of the 20th Regiment of he State Militia. When the British fleet appeared off New London, troops were alled to defend the city, and the Light Infantry of Norwich, under the command of olonel Leffingwell, responded in the best order and were well-equipped.

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[1] Caulkins, Frances M., *History of Norwich, Connecticut*, p. 607.

As a member of the Connecticut Committee of Correspondence and a confidential dvisor of Governor Trumbull and Silas Deane, he rendered even greater service to he patriotic cause. When the summons came from the Boston Committee of Correpondence, in March, 1774, for a united resistance to the oppressive measures of ngland, Norwich gave a hearty response and pre-eminent among the citizens was olonel Leffingwell. The *American Archives*, published by the United States Governent, contains many references to his services during the Revolutionary War.

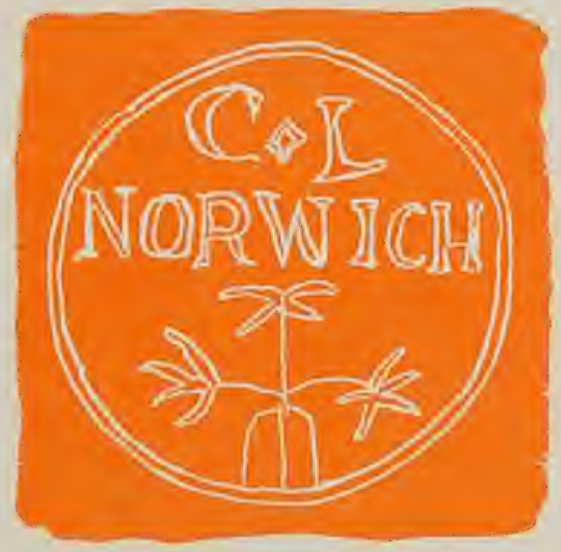
In 1776 Leffingwell's son-in-law, Thomas Hubbard, who had been associated with im, took over the mill and members of the Hubbard family continued to operate the aper mill well on into the next century.

Leffingwell's personal appearance as described by Daniel Coit Gilman, a native of orwich and the first president of Johns Hopkins University, was "stately and enerable in form, head white with years, with dignified bearing of a gentleman of he old school; energetic in manner, with all the characteristics of the successful man f business."

General Washington was entertained in Leffingwell's home, and in 1784 Washington ppointed him the first naval officer under the new government. His son Daniel was personal friend of Washington Irving and traveled with Irving in Europe, and is entioned in Irving's diary.

The location of the numerous Leffingwell business activities was called "Leffingwell ow." Another first of the Leffingwell enterprises, which began to operate in 1766, vas the weaving of stockings. By 1791 there were ine looms in operation, with an output of 1,200 to ,500 pairs of hose per annum. The manufacture mployed worsted, cotton, linen, and silk. The silk ose ranged in value from 12 to 20 shillings. Gloves nd purses were also woven and five operatives were mployed.

Leffingwell's life was exemplary and the community in which he was a leader was inspired and rofited because of his industry and initiative.



A reproduction of a tracing made of the Leffingwell watermark as it appeared in paper used for a document dated October 7, 1771.

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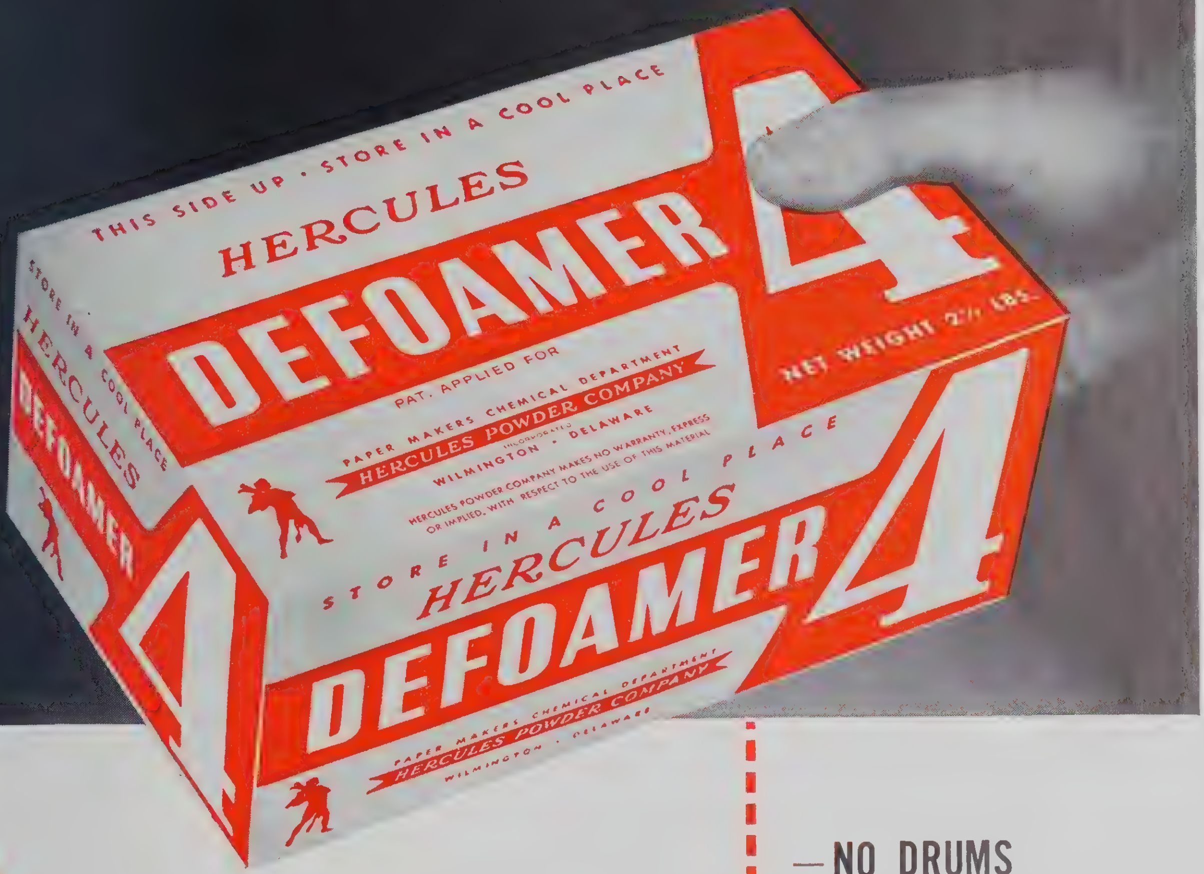

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